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nos. 392-846

EL Karlstrom
1955

Catalogue.

1.3 mi. N, 0.2 mi. W of Civic Center, Richmond
Contra Costa Co., Calif. Feb. 1, 1955

392♂ Hyla regilla
393 " "
394 " "
395 " "
396 " "

Same locality Feb. 15, 1955

397♂ Bufo boreas halophilus
397a " " " (Skeleton) SV length 76 mm.

2 mi. S of Briceburg, 1900 feet, Mariposa Co.
Calif. Feb. 17, 1955

398 Taricha (torosa) sierrae
399 " " "

Briceburg, 1200 feet, Mariposa Co., Calif.
Feb. 17, 1955

400♂ Hydromantes brunus
401♀ " "
402 " "
403 Aneides lugubris ad. ♂
404 Diadophis amabilis pulchellus
405 Batrachoseps attenuatus
406 " "

Jct. South Fork of Merced with Merced River
1500', Mariposa Co., Calif. Feb. 17, 1955

407 Batrachoseps attenuatus

Hwy 140, 1 mi. W x SW El Portal, 1700 feet.
Mariposa Co., Calif. Feb. 17, 1955

408 Batrachoseps attenuatus

ELKordstum
1955

Catalogue

Base Cathedral Rocks, 4150 feet, Y.N.P., Mariposa Co., Calif. Feb. 17, 1955

409 Ensatina e. platensis (juvenal)

7 mi. E and 5 mi. N of Planada, 500 feet, Mariposa Co., Calif. Feb. 17, 1955

410 Rana catesbeiana adult

~~411 " " tadpoles~~ Catalogued by RC Stebbins

Hwy. 140, 4 mi. NE Planada, 400 ft., Merced Co., Calif. Feb. 17, 1955

412 ♂ Bufo boreas halophilus

Marsh Creek Springs area, Contra Costa Co., Calif Nov. 8, 1954

413 Bufo boreas halophilus (collected by RC Stebbins and killed Feb. 28, 1955 for skeleton) SV = 61 mm. (skeleton)

1.3 mi. N, 0.2 mi. W Civic Center, Richmond, Contra Costa Co., Calif. Jan. 10, 1955

414 Bufo boreas halophilus (juvenile)

415 " " "

18 miles S of Monticello on Hwy. 37, Napa Co., Calif. Jan. 31, 1955. skinned RF3

416 Bufo boreas halophilus ad. ♀♀ (skeleton) (coll. by Jim D. Anderson) SV=97 mm.

Tub Lake, 1.5 mi. NW of San Quentin State Penitentiary, Marin Co., Calif. Feb. 22, 1955

417 Bufo boreas halophilus (subadult) coll. Dick Russell

418 " " " (juvenal) " " "

E L Karlstrom

Catalogue

Tub Lake, 1.5 mi. N of San Quentin State Penitentiary, Marin Co., Calif. Feb 22, 1955

419 Taricha ~~torosa~~ granulosa

1.3 mi. N., 0.2 mi. W Civic Center, Richmond, Contra Costa Co., Calif. Feb. 22, 1955

420 Bufo boreas halophilus eggs.

Same locality Feb. 26, 1955

421 Bufo boreas (juvenile)
422 " " (adult) ♂ Clipped RH3 SV = 76.6 } skeletons
423 " " " ♂ " LH3 SV = 73.2
424 " " " ♂ " RH1 SV = 78.1
425 " " "? ♀ " LF2 SV = 72.5

Same locality March 2, 1955

426 Bufo boreas halophilus adult ♀♀ clipped LF 3 (skeleton) SV = 82.3
427 " " " " ♂ " RF3

Same locality March 12, 1955

428 ♂ Bufo boreas halophilus adult
429 ♂ " " " "
430 ♀ " " " "
431 ♂ " " " "

E. L. Karlstrom

Catalogue

Harvey M. Hall Natural Area, 10,100', E base
Mt. Conness, Mono Co., Calif. July 30, 1952

432 Bufo canorus toads (collected by R. L. Livezey)

~~433 "~~

1½ mi. S Ebbett's Pass, 7800', Alpine Co.,
Calif. Aug. 11, 1952

433 Bufo canorus toads (coll. by R. L. Livezey)

Warm Springs Creek, 1.5 mi. NW of Skaggs Springs.
Sonoma Co., Calif. March 19, 1955

434 Taricha rivularis

435 " "

436 " "

437 " "

438 " "

439 Dicamptodon ensatus larva (from side creek)

439a " " "

PC 430d Aneides flavipunctatus

431d " "

432d " "

~~433 " "~~

433d Bufo boreas (coll. by Burt Combs)

434d Gerrhonotus multicarinatus

435d Sceloporus occidentalis

~~436d " "~~ } lost to Zool. 137 collection.

~~437d " "~~

438d Eumeces skiltonianus

439d " "

440 Diadophis amabilis

duplication of numbers d = duplicate

note field

ELKorlstrom

Catalogue

3 mi. W x NW of McDonald on Hwy 128
Mendocino Co., Calif., March 19, 1955

441 Rana boylei
442 " "
443 Aneides lugubris
444 " "
445 " "
446 " "

0.6 mi. W of Navarro on Hwy 128,
Mendocino Co., Calif. March 19, 1955

447 Aneides lugubris
448 " "
449 " "
450 Batrachoseps attenuatus
451 " "

½ mi. N Rockport on Hwy 1, Mendocino
Co., Calif., March 19, 1955

452 Ambystoma gracile (collected by Burt Combs)
453 Batrachoseps attenuatus
454 " "
455 " "
456 Gerrhonotus coeruleus

6 mi. N Rockport on Hwy 1, Mendocino Co.,
Calif. March 19, 1955

457 Ensatina eschscholtzi
458 " "

ELKarlstrom

Catalogue

6 mi. N Rockport on Hwy 1, Mendocino Co., Calif. March 19, 1955

459 Aneides ferreus
460 " "
461 " "
462 " lugubris
462a " ferreus juvenile

3.7 mi. E Blue Lake, Humboldt Co. Calif. March 20, 1955

PC 463 Rhyacotriton olympicus
PC 464 " "
465 " " larvae (10)
466 Aneides ferreus
467 Ensatina eschscholtzi
468 Batrachoseps attenuatus
469 " "
470 " "

3½ mi. SE Scotia on U.S. 101, Humboldt Co., Calif. March 20, 1955

471 Taricha granulosa
472 " "
473 Rana aurora
474 " "
474a " " (tadpoles)
475 Ambystoma gracile larvae
476 Hyla regilla
477 " "
478 " "

El Karlstrom
1955

Catalogue

3½ mi SE Scotia on U.S. 101, Humboldt Co., Calif. March 20, 1955

479 Hyla regilla
480 " "
481 " "
482 " "

5.6 mi. N Garberville on U.S. 101, Humboldt Co., Calif. March 20, 1955

483 Aneides ~~ferreus~~ flavipunctatus
484 " "
485 " "
486 " "
487 " "
488 " "

Stephens Grove on Eel River, Humboldt State Park, Humboldt Co., Calif. March 19, 1955

PC 489 Entosphenus tridentatus (lamprey)
PC 490 " " "

1.3 mi. N, 0.2 mi. W of Civic Center Richmond Contra Costa Co., Calif. March 23, 1955

491 Bufo boreas adult ♀
492 " " " ♂

E L Karlstrom

Catalogue

Wildcat Canyon, Tilden Regional Park, Contra Costa Co., Calif. March 26, 1955

493 Taricha torosa (granulosa hybrid?)

494 " "

495 " "

496 " "

"McKay's", 6½ mi. E of Avery, 4175 feet, Stanislaus Co., Calif. June 7, 1952

(4a RLL)

…2 61838 497 Bufo boreas halophilus tadpoles (collected by R. L. Livezey and contributed MVZ) Preserved Aug. 1952.

Mariposa Creek; west side of Mariposa, 1900 feet Mariposa Co., Calif. April 13, 1955

498 Bufo boreas halophilus adult ♀ skeleton

499 " " " " ♂ "

500 " " " " " "

501 " " " " " "

502 " " " " " "

BCR LF3 503 " " " " " canorus-like pattern & color

504 " " " " "

505 " " " " "

506 " " " " "

507 " " " " "

508 " " " " "

509 " " " " "

ELKarlstrom

Catalogue

Mariposa Creek, SW side of Mariposa, 1900 feet, Mariposa County, Calif. April 13, 1955

510 Bufo boreas halophilus adult ♂

511 " " " "

512 " " " "

513 " " " "

514 " " " "

515 " " " "

516 " " " "

517 Rana catesbeiana adult ♂ "

~~518 " " " "~~

518 Bufo boreas halophilus tadpoles.

Sentinel meadow, ½ mile SW of Government Center 4000' Yosemite Valley, Mariposa Co., Calif. April 12, 1955

519 Hyla regilla

520 " "

521 " "

522 " "

523 " "

524 " "

525 " "

526 " "

527 " "

528 " "

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1955

Catalogue

Briceburg, 1200 ft., Mariposa Co., Calif.
April 26, 1955

529 Aneides lugubris (coll. John Burns)
530 " " " " "
531 " "
532 " "
533 " " juvenile (coll. John Burns)
534 Eumeces gilberti gilberti juvenile (coll. John Burns)
535 " " "
536 Diadophis amabilis
537 Rana boylei
538 Taricha torosa sierrae

Mariposa Creek, SW side of Mariposa, 1900 ft.
Mariposa Co., Calif. April 27, 1955

539 Bufo boreas ad. ♀ (coll. by John Burns)
540 " " ad. ♂
~~541 " " " "~~ died & dried after escaping from aquarium
542 " " " "
543 " " " "
544 " " " "
545 " " " "
546 " " " "
547 " " " "
548 " " " "
~~549 Rana catesbeiana~~ } used for pituitaries. no tags written.
~~550 " "~~

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Catalogue

Ahwahnee meadow, 4000 ft., Yosemite Valley, Yosemite National Park, Mariposa Co., Calif. May 11, 1955

551 Bufo boreas halophilus ad. ♂ Testes pres. Bouin

Stoneman mdw., 4000 ft., Yosemite Valley, Mariposa Co., Calif. May 18, 1955

552 Bufo boreas halophilus

553 " " " LT 6.6 x 4.1 RT 10.7 x 4.0

554 " " " LT 8.3 x 2.8 mm. RT 6.9 x 3.0

555 " " "

556 " " "

8 mi. NE Planada, 600 ft., Mariposa Co., Calif

May 18, 1955

YNP museum gift

557 Sceloporus occidentalis

= added to Yosemite Museum.

3 mi NW of Mariposa, 2200 ft., Mariposa Co. Calif., May 18, 1955

558 Sceloporus occidentalis ♀ (run over while crossing Hwy 49)

2 mi. NE Chinquapin, 7050 ft., Y.N.P. Mariposa Co., Calif. May 19, 1955

559 Ensatina eschscholtzi platensis

560 " " "

561 " " "

562a Rana muscosa tadpoles

3 mi. ExNE Chinquapin, 7500 ft., Y.N.P. Mariposa Co., Calif., May 19, 1955

562 Rana muscosa

563 " "

564 " "

ELKarlstrom

Catalogue

3 mi. E x NE Chinquapin, 7500 ft., Y.N.P.
Mariposa Co., Calif., May 19, 1955

565 *Rana muscosa*

566 " "

567 " "

~~568 "~~

3 mi. NW Hobart mills, 6400 ft., Nevada
Co., Calif. May 23, 1955

568 *Bufo boreas* ♀ (coll. by Joe Hall Sagehen Creek)

1.3 mi. N, 0.2 mi W Civic Center Richmond, Contra Costa Co.,
Calif. June 1, 1955

569 *Bufo boreas halophilus* ad. ♀ cl. RFI

570 " " "

571 " " "

572 " " "

S Fork Merced River NW of Wawona, Mariposa
Co., Calif. April 1955

YNP 573 *Diadophis amabilis* (~~coll. by~~ Given to Glen Callison)

Berkeley, Alameda Co., California (Turned into Museum Vert Zool.)
June 2, 1955

YNP 574 *Pituophis catenifer*

2 mi. W of Mariposa on Hwy 140, 2300 ft.,
Mariposa Co., Calif. June 4, 1955

YNP 575 *Pituophis catenifer*

E L Karlstrom
1955

Catalogue

4 mi. SW Mariposa on Hwy 140, 2200 ft.
Mariposa Co., Calif. April 12, 1955

YMP 576 Ensatina gilberti adult

Wildcat Canyon, Tilden Regional Park, Contra
Costa Co., Calif. May 20, 1955

YMP 577 Sceloporus occidentalis
YMP 578 " "

North side Huntington Lake, 6950 ft., Fresno Co.,
Calif. June 6, 1955

579 Rana muscosa
580 Hyla regilla
581 " "

Kaiser Peak Mdws., 8000 ft., Fresno Co., Calif
June 7, 1955

582 Thamnophis elegans
583 Rana muscosa
584 " "
584a " " eggs
585 Hyla regilla
586 " "
587 " "
588 " "
589 ~~600~~ " "
590 ~~601~~ " "
600 ~~602~~ " "
601 Bufo canorus ♀
602 " " eggs from #601
603 " " ♂

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1955

Catalogue

Kaiser Peak meadows, 8000 ft., Fresno Co., Calif.

June 7, 1955

604 Bufo canorus ad. ♂
605 " " " "
606 " " " "
607 " " " "
608 " " " "
608a " " eggs (a full complement?)

0.2 miles NE Kaiser Pass, 9200 ft., Fresno Co.

June 7, 1955

609 Bufo canorus ad. ♂ ~~(coll. by Dave Hilz)~~
610 " " " ~~" " " "~~
611 " " " ~~" " " "~~
612 " " "
613 " " "
614 " " "
~~YNPM no ♂~~ ~~615 " " " (coll. by Dave Hilz)~~
616 " " " " " " "
617 " " " " " " "
618 " " "
619 " " "
620 " " ad. ♀
621 " " eggs of #620
YNP M ♂ LFZ 622 " " ad. ♀
623 " " eggs of #623
624 " " juvenile
625 " " ad. ♀
626 " " " "
627 " " " "

E L Karlstrom
1955

Catalogue

O.2 mi. NE Kaiser Pass, 9200 ft., Fresno Co.
Calif. June 7, 1955

628	*Hyla regilla*	
629	" "	
630	" "	
~~631~~	~~" "~~	alive to Drew Hidy

Horse Corral mdw., 7645 ft., Sierra Nat'l. Forest
Fresno Co., Calif. June 8, 1955

632	*Bufo boreas*	ad. ♂
633	" "	" "
634	" "	" "
635	" "	ad. ♀
636	" "	tadpoles
637	Rana muscosa	
638	" "	
639	" "	
640	" "	
641	" "	
642	" "	
643	" "	tadpoles
643a, 643b, 643c	*Thamnophis elegans*	

Summit mdw, 8100 ft., King's Canyon Nat'l. Park
Fresno Co., Calif. June 9, 1955

644	*Batrachoseps attenuatus*	
645	" "	
646	" "	
647	" "	

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1955

Catalogue

Summit Mdw., 8100 ft., Kings Canyon Natl. Park
Fresno Co., Calif. June 9, 1955

648 Batrachoseps attenuatus
649 " "
650 " "
651 " "
652 " "
653 Rana muscosa
654 " "
655 " "
656 " "
657 " "
658 " "
~~659 " "~~
~~660 " "~~
661 Hyla regilla
662 " "

Long Meadow 7500 ft, 3 mi. N x NE Giant Forest, Sequoia
Natl. Park, Tulare Co., Calif. June 10, 1955

663 Rana muscosa
664 " "
665 " "
666 Bufo boreas tadpoles.
GCR 667 Bufo boreas adult ♀ LF4
668 " " " "
GCR 669 " " adult ♂ RF4
670 " " " "

E L Karlstrom
1955

Catalogue

Long mdw., 7500 ft, 3 mi. N x NE Giant Forest, Sequoia N.P., Tulare Co., Calif. June 10, 1955

671 Bufo boreas ad. ♂

~~672 " " "~~ miscounted

673 " " subadult

674 " " "

~~675 Rana muscosa adult~~

6 mi. NW of Glenville, 3000 ft., Kern Co., Calif.
June 11, 1955

YNP M
CR. AF4 676 Eumeces gilberti

Grapevine Canyon, 6 mi. SW Bonn, 2600 ft., Kern Co., Calif

June 11, 1955

677 Bufo boreas ad. ♀.

Batchelder Spring, 5000 ft, 7 mi. NE Big Pine, Inyo Co., Calif. June 13, 1955

678 Sceloporus occidentalis

679 " "

680 " "

YNP M
Q. AH4 ~~681 "~~ lizard lost

" 682 " "

" 683 " "

684 Sceloporus graciosus pres. 6/17

~~YNP M LH4 685 " "~~ lost

" LH4 686 " "

Q. RH1 687 Uta stansburiana

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Catalogue

Deep Springs Valley, 5200 ~~3920~~ ft., 6 mi. S of Deep Springs P.O., Inyo Co., Calif. June 13, 1955

688 Bufo (boreas) exsul ad. ♀

689 " " " " "

690 " " " ~~ad. ♂~~

691 " " " ad. ♀

692 " " " " "

693 " " " ad. ♂

694 " " " " "

695

~~696~~

697

698

699

700

701

702 " " " tadpoles

703 Scaphiopus hammondi

704 " " tadpoles

Deep Spgs. Valley, 4 mi. SW Deep Spgs. Post Office 5000 ~~4400~~ ft., Inyo Co., Calif. June 13, 1955

705 Crotaphytus wislizeni D.O.R.

NE edge of Big Pine, 4002 ft., Inyo Co., Calif. June 13, 1955

706 Bufo boreas ad. ♂

ELKarlstrom
1955

Catalogue

Reds mdw. near Devils Postpile Natl. monument, 7500 ft.
Madera Co., Calif. June 16, 1955

~~707 Thamnophis elegans~~

708 Rana muscosa

709 " "

710 " "

711 " "

712 " "

713 " "

714 " "

2 mi. E x SE of Auberry, 3200 ft., Fresno Co.
Calif. June 6, 1955

YNP m. 715 Gerrhonotus multicarinatus ♀

1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra
Costa Co., Calif. June 19, 1955

GCR 716 Bufo boreas ad. ♂ LF 2+3

" 717 " " juvenile RF 2

Porcupine Flat, 8400 ft., Y.N.P., Mariposa Co.,
Calif. June 25, 1955

718 Thamnophis elegans

~~719 Bufo canorus tadpoles.~~ ?

719 Rana muscosa

Ahwahne mdw., Yosemite Valley, 4000 ft., Mariposa
Co., Calif. June ~~17~~ 6, 1955

~~720 Bufo boreas~~

720 Bufo boreas tadpoles (and Hyla)

E L Karlstrom
1955

Catalogue

Tioga Pass, ½ mi. SE Ranger Station, 9800 ft.
Tuolumne Co., Calif. June 25, 1955

721 Bufo canorus ad. ♂
722 " " "
723 " " "
724 " " "
725 " " ad. ♀
726 " " " "
727 " " juv.
728 " " "
729 " " "
730 " " "
731 " " " (4 animals)

200 yards NE Ranger Station Tioga Pass, 9900 ft.
Mono Co., Calif. June 25, 1955

732 Bufo canorus ad. ♂
733 " " tadpoles
734 " " eggs

Heenan Lake, 7000 ft., 7 mi. ExSE Markleeville
Alpine Co., Calif. June 26, 1955

× 735 Thamnophis elegans

2.4 mi. S of Hwy. 4 on Highland Lakes Road
7800 ft., Alpine Co., Calif. June 26, 1955

736 Bufo canorus juv.
737 " " series of yearling toads
738 " " tadpoles.

E.L. Karlstrom
1955

Catalogue

2½ mi. S of Ebbetts Pass, 8000 ft., Alpine Co., Calif.
June 26, 1955

739 Bufo canorus tadpoles

NE side Highland Lake, 8500 ft., Alpine Co. Calif. June 26, 1955

740 Bufo canorus ad. ♂ } Died in jar prior to preservation. Bad shape
741 " " " "
742 " " " "
743 " " " "
744 " " " "
745 " " " "
746 " " ad. ♀ ♂
747 " " " "
748 " " " ♀
749 " " " "
750 " " series of preserved yearlings
751 " " ~~juv.~~
752 " " "
753 " " "

SE side above Highland Lake, 8900 ft., Alpine Co., Calif. June 26, 1955

754 Bufo canorus (coll. Hank Lysett)
755 " " " " "
756 " " " " "

ELKarlstrom
1955

Catalogue

Charity Valley, 7700 ft., Alpine Co., Calif
June 27, 1955

~~757 Bufo boreas tadpoles~~

758 Bufo boreas

1/2 mi. ExSE of the nipple, 8200 ft, Alpine Co. Calif. June 27, 1955

759 Bufo boreas

760 " "

Sentinel Beach, 4000 ft., Yosemite Valley
Mariposa Co, Calif. July 1, 1955

761 Bufo boreas halophilus (coll. by Paul Elkins)

200 yds. NE Tioga Pass Ranger Stat. 9900 ft.
Mono Co., Calif. July 8, 1955

762 Bufo canorus tadpoles ← → 1/4 mi. SE Station, Tuolumne Co. Calif. 9800 ft.

~~763 " " ad. ♂~~

~~764 " " " "~~

765 " " juv.

766 " " "

767 " " "

Ahwahnee Mdw., 4000 ft., Yosemite Valley
Mariposa Co., Calif. July 8, 1955

768 Bufo boreas halophilus

769 " " "

Gov't. Center, 4000 ft, Yos. Valley,
Mariposa Co., Calif. July 12, 1955

770 Bufo boreas ad. ♂ (coll. Mario Giuntoli)

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1955

Catalogue

Camp 19, 4000 ft., Yosemite Valley, Mariposa Co., Calif. July 13, 1955

771 Bufo boreas halophilus
772 " " "

Y.N.P.
Glacier Point, 7200 ft., Mariposa Co., Calif July 1955

773 Sceloporus occidentalis (coll. by Sol Kahn)
774 " " " " " "

Porcupine Flat, 8000 ft, Mariposa Co. Calif. June 30, 1955

775 Thamnophis elegans (coll. by Hank Lipsett)

NE side Highland Lake, 8500 ft., Alpine Co Calif. June 26, 1955

776 Hyla regilla
777 " "
778 " "
779 " "
780 " "

Camp 19, 4000 ft., Yosemite Valley, Mariposa Co., Calif. July 17, 1955

781 Bufo boreas

Glacier Canyon, ca 1 mi. N x NE Tioga Pass, 10,500 ft., Mono Co., Calif. July 17, 1955

782 Bufo canorus ad. ♀ (coll. by M.J. Warne)
783 " " juv. " " " "

ELKadstrom
1955

Catalogue

Faith Valley, 7500 ft., Alpine Co., Calif
July 19, 1955

784 Bufo boreas tadpoles.

6 mi. W Ebbetts Pass, 7700 ft, Alpine
Co., Calif. July 20, 1955

785 Bufo boreas tadpoles

786 Ambystoma macrodactylum

787 " "

788 " "

~~789 " "~~ Escaped from aquarium

NE side Highland Lake, 8500 ft., Alpine Co.
Calif. July 20, 1955

790 Bufo canorus ad. ♀

791 " " ad. ♂

792 " " "

793 " " "

794 " " "

795 " " juv.

796 " " tadpoles

Tryon mdw., 8200 ft., 1 mi. N Highland Lake
Alpine Co., Calif. July 20, 1955

797 Bufo canorus tadpoles

Tioga Pass, ½ mi. SE Ranger Stat., 9800 ft.
Tuolumne Co., Calif. July 19, 1955

798 Bufo canorus ad. ♂

799 " " " "

800 " " " "

801 " " juv. — donated Yosemite museum

801a " "

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1955

Catalogue

Sentinel mdw., 4000 ft., Yosemite Valley, Mariposa Co., Calif. July 21, 1955

802 Bufo boreas ad. ♀ (coll. by Paul Elkins)
803 " " " " " " " "

Camp 19, 4000 ft., Yosemite Valley, Mariposa Co., Calif. July 25, 1955

804 Bufo boreas (coll. M.J. Karlstrom)
805 " " " " "
806 " " (coll. Mary V. Hood)

Ahwahnee mdw., 4000 ft., Yosemite Valley Mariposa Co., Calif. Aug. 23, 1955

807 Bufo boreas ad. ♂
808 " " " " testes & stomach preserved Bouin's 8/24/55
LT 10.4 x 4.1 mm. B.O. 2 mm.
808a " " RT 11.3 x 4.5 " " 4 mm

Warehouse area Gov't Center, 4000 ft., Yosemite Valley, Mariposa Co., Calif. Aug. 26, 1955

809 Bufo boreas ad. ♀ (coll. Merv Gientoli) SV 84.5 mm
Stomach & colon contents preserved, also eggs & fat body.

½ mile S Tioga Pass Ranger Station, 9800 ft. Tuolumne Co., Calif. Aug. 30, 1955

810 Bufo canorus 51.8 ad ♀
811 " " 42.6
812 " "
813 " "
814 " " ad ♂
815 " " "
~~816 "~~

ELKarlstrom
1955

Catalogue

300± yds. NE Tioga Pass Ranger Station, 9900 ft.
Mono Co., Calif. Aug. 30, 1955

817 Bufo canorus (series of metamorphosed toadlets)
818 " " ad. ♂ S-V 49.9 mm. S-V. } skeletons
819 " " " 48.2 mm. "
820 " " ad. ♂ 49.5 mm. "
821 " " juv 30.1 sex ?
822 " "
823 " "

Govt. Warehouse area, 4000 ft., Yosemite Valley
Mariposa Co., Calif. Sept. 3, 1955

824 Bufo boreas halophilus (coll. Merv Buntoli)
825 " " " " " "
826 " " " " " "

Camp 19, 4000 ft., Yos. Valley, Mariposa Co.
Calif. Sept. 4, 1955

827 Bufo boreas halophilus

Govt. Residence area, 4000 ft., Yos. Valley
Mariposa Co., Calif. June-July 1955

828 Bufo boreas halophilus ad. ♀ } collected by local kids and kept for exhibit at museum
829 " " " "
830 " " " "

Hetch Hetchy Dam, 3700 ft., Tuolumne
Co., Calif. June 1955

831 Clemmys marmorata ad. ♀ laid 7 eggs Yos. museum July 23, 1955. Collected by naturalist "Buck" Evans Ranger at Mather Station.

ELKarlstrom
1955

Catalogue

Ahwahnee Mdw., 4000 ft., Yosemite Valley, Mariposa Co., Calif. Sept. 8, 1955

832 Bufo boreas (5) juveniles
833 " " adult
834 " " "
835 " " "
~~836 " " "~~ Radioactive

½ mi. S Tioga Pass Ranger Station, 9800 ft. Tuolumne Co., Calif. Summer 1955

Died & dried 10/9/55
837 Bufo canorus ad. ♀ (exhibited Yosemite museum)

Yosemite Valley, 4000 ft., Y.N.P., Mariposa Co., Calif. Summer 1955

838 Bufo boreas } collectors unknown. Exhibited
839 " " } Yosemite museum.

3 mi. NW of Walnut Creek, Contra Costa Co., Calif. ~~Oct~~ Sept. 27, 1955

Donated live to RCS { 840 Scaphiopus occidentalis adult
{ 841 " " juv.

300± yds NE Tioga Pass Ranger Station, 9900 ft. Mono Co., Calif. Oct. 8, 1955

842 Bufo canorus juveniles (5)

1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif. Nov. 13, 1955

843 Bufo boreas ad. ♀

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1.3 mi. N, 0.2 mi. W Civic Center, Richmond
Contra Costa Co., Calif. Nov. 19, 1955

844

7 mi. SE Fayetteville, Fayette Co., Texas, Oct. 1955

ERU #250 845 Bufo valliceps

#251 846 " fowleri

Field Notes 1955

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Feb. 17 Left Berkeley 4:35 A.M. MVZ truck with Bob and son John Stebbins, Dick Russell. Usual route Walnut Creek, Tracy, Merced. Heavy but patchy fog, particularly on western ½ of Sacramento Valley. Arrived Merced 7:45 A.M., gas stop. Took State Hwy 140 to Yosemite. Overcast, slight drizzle in foothills. Planada 116.4. Possible *Scaphiopus* localities where creek crosses road 124.3 and 124.9. Lloyd's Corral 129.7, Mt. Bullion cutoff (to Hwy 49) 139.1.

First stop 2½ mi. S of Briceburg, 2400 feet Mariposa Co., Calif. Checked W and SW facing slopes above Bear Creek. *Taricha torosa sierrae* on road here and I took one ♀ 2 feet from creek. Moisture on slope at this time but possibly too dry in summer for plethodontids.

Next stop farther down the Briceburg Grade (149.7) actually 1.6 (speedometer) road miles S of Briceburg but official locality written first by Stebbins as 2 mi. S of Briceburg, 1900 feet, Mariposa Co., California NE facing slope 30-40°. Small creek cascades down to pass thru recently built culvert along and under newly widened and paved Hwy 140. Slope here have been "control"-burned last September. Rock blasted off hillside above (W of) the road. Jot Gorman had previously collected *Ensatina e. xanthoptica* here. Russell discovered first *Hydromantes brunus* and R. Stebbins took another, also *Aneides*, I took 3 *Taricha*

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Feb. 17 torosa sierrae from a pool found by the creek. Live and D.O.R. Taricha first encountered near top of Briceburg Grade, about 3000 feet altitude. We counted 46 D.O.R. Taricha over 1.6 road miles between mentioned locality and Briceburg. Briceburg mileage (151.3)

Briceburg, 1500 feet, Mariposa Co., California SE slope above Merced River in area just SW of Briceburg Inn. 6 Hydromantes ~~brunus~~, 2 Aneides lugubris, 5 Batrachoseps, 1 Diadophis. Overcast but some short periods of sunshine. Surface moist and good soil seepage. Rains had commenced Feb. 16 after long dry spell. Taricha out but none taken here.

Junction S Fork Merced and Merced River, 1500 ft. Mariposa Co., Calif. SE of Hwy 140 up the ~~steep slope~~ South bank of the Fork. 2 Aneides, 2 Batrachoseps! ~~Ensatina~~ Light drizzle from here into Yosemite Valley where we checked in with Hubbard for social call. Snow on Valley floor varied from a few to 15 inches. Intermittent drizzle, low clouds obscuring Half Dome and other higher points, cool.

Base of Cathedral Rocks, 4150 feet, Y.N.P., Mariposa Co., Calif. 7 Ensatina (3 juveniles) taken on snow-patched 25-30° slope S side of Valley.

note several Batrachoseps also collected ~~at~~ above (East of) Savage Trading Post, 1 mile W x SW of El Portal, 1700 ft., Mariposa Co., Calif. About 5 Batrachoseps here but

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Feb. 17 no sign of other salamanders even after extensive rock and litter-rolling up along the small mine trestle built here. Stebbins and Gorman got nothing here in Feb. 1953. This is probable most eastward locality (authentic) for Batrachoseps, although the questionable Yosemite Park (near Chinquapin?) locality once verbally reported to John Hendrickson may have been valid. Stebbins told me that Hendrickson never did write the locality down or check it out after given it by a YNP Ranger.

We left Yosemite Valley about 4 P.M. Another stop at Briceburg where additional Hydromantes (3?) taken. 5 P.M. The roadside about 2 miles NE of Briceburg was checked out but no Hydromantes. Stebbins and Gorman never had been able to extend their range northeastward from Gorman's type locality 0.7 mi. NE Briceburg. Small Aneides, Batrachoseps taken.

Supper stop N side of Mariposa. Took Mt. Bullion cutoff to Hwy 140. Overcast sky, cool, moderate winds. Several listening stops for spadefoot toads. Hyla only heard.

8 P.M.

7 mi. E, 5 miles N of Planada, about 500 ft, Mariposa Co., Calif. Small brook (Mila Creek) crosses road number of times here. Rana catesbeiana toads and 2 large adults, 1 subadult collected. Hyla (few) out and calling. Eggs not seen. Sky clearing, air 10-12°C.

Live adult Bufo boreas on Hwy 140, 4 mi. NE of Planada, Mariposa Co., Calif. Also D.O.R. 3 mi NE Planada

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March 19 MVZ and Zool. 137 class trip to northwest coast of California. Left campus 6:45 A.M., took ferry from Richmond to San Rafael, then U.S. 101 north. Foggy over Bay but clearing, fair skies after. Went to Skaggs Springs just N of Geyserville on 101. First two stops 1½ mi. W of Skaggs Springs. Aneides flavipunctatus (5) A. lugubris (1), Batrachoseps, Taricha rivularis (15), T. granulosa (large adult ♂s), Gerrhonotus multic. (1), Scelopor. (5), Eumeces (3), Diadophis (1). Six of us collecting (R. Stebbins, Wilfred Ward [Sierra Club] Burt Combs, Bob Golden, Don Roberts of Zool. 137 class). Actually, two local areas at Skaggs were searched. A small tributary creek emptying into Warm Springs Creek had the Dicamptodon larvae. Both creeks had Taricha, and it appeared as if rivularis were going up the culvert under road to reach the tributary.

We drove back to Hwy. 101, continued north past Geyserville and then took Hwy 128 (#28 on map) Second stop 11 A.M. W of McDonald (see ~~journal~~ catalogue for exact localities) where R. boylei and many Aneides lugubris taken. Upper Sonoma country bare but coniferous growth getting heavier on N-facing slopes. Clear skies, moderate breeze. 3rd stop just W of Navarro where Aneides, Batrachoseps taken. We then came to Hwy 1 on the coast. Brief stop 1-2 P.M. at

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March 19 Russian Gulch State Park. This is southern known limit of Ascaphus. Stebbins says 2 adults were collected ~~like~~ as Hyla here by Bill Salt. Lab identification came later. We searched stream and edges for both Ascaphus and Dicamptodon without luck. Rana aurora (2) were collected. 4th stop ½ mi. N Rockport. Ambyst. gracile adult & egg clusters, Batrachoseps, Ensatina, Gerrhonotus coeruleus taken. First Aneides ferreus collected at 5th stop, 6 mi. N of Rockport. A. ferreus, A. lugubris, "Bats", Ensatina taken. Supper Garberville. Overnight camp at Stephens Grove ~~St~~, Humboldt State Park on U.S. 101. Hyla, 2 lampreys collected in Eel River.

March 20 Major stop at 3.7 mi. E Blue Lake on Hwy 299 above Arcata. Clear, mild weather. Good flow in ~~sg~~ creeks, although no real rain for week or so (?) Boonville gas station operator said no rain for 3 weeks that locality. Rhyacotriton adults (14) and larvae (11) collected along creek. Aneides ferreus, Rana aurora, Hyla also taken. No Plethodon elongatus. Last collecting stop for our car (Ward's) was 3½ mi. S Scotia on 101. Large pond here. Hyla (7) R. aurora (2) and eggs & tads, Ambystoma gracile eggs, Taricha granulosa at 2:30 P.M. Home via Geyserville & Napa Valley 10:30 P.M.

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April 12 Left MVZ 8:30 A.M. for Yosemite Valley. Driving alone this trip. Initial speedometer reading 35477.8 at MVZ, tank full. Tracy 9:50, Modesto 10:20. Merced (35604.0) at 11:15 A.M. Hazy sun in Valley, mild temperatures. Valley generally dry, no standing water in ponds or creeks along highway until I hit U.S. 99 from Modesto to Merced.

Possible spadefoot toad sites. Planada on Hwy 140 (613.8) east side of town. Standing water in pasture (614.6) and a culvert 21.1. Road to Hornitos (630.0) and cutoff to Mt. Bullion (634.4) I stayed on Hwy. 140 to Mariposa. First stop (637.6) a small tributary to Agua Fria creek. Shallow flow in the creeks, hillsides dry. One Ensatina gilberti taken here. Mariposa (642.2) SW end of town. Took road toward Wawona Bar, along creek. Pond areas near the Fairgrounds 1.8 miles from Mariposa. Conversation with a lady who lived near the pond (part on her property) revealed fact that bullfrogs were there. She has seen "toads" (probably Bufo) around her house. The dammed-up lake near the crushed rock plant on this road (between Mariposa & Fairgrounds) has been in existence at least three years. Drove directly to Yosemite Valley, arriving at museum 2:15 P.M. (5688 speedometer) Hazy warm sun continued, same in Valley.

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April 12 The Valley floor lacks snow and it is patchy on the rim and in the draws. Practically none on south-facing rim. The meadows are much drier than this time last year (see Bufo accounts). Half Dome has relatively small patch snow on top. meadows are 9/10ths brown, but green grasses are appearing. Weather remained still and quite clear into the evening. much water in the main falls but the merced is not high, and many small tributaries to it are bone dry. The forecast appears to be one of Yosemite's (California's) driest seasons.

Evening check of several meadows in Yosemite Valley. meadow S & SW of Govt. Center - Hyla active but no signs of Bufo. Thamnophis observed in a pond, apparently preying on Hyla. Air temp. 7:50 P.M. 7.3° C. 1" above dry meadow grass. Evening clear and cool, no breeze. Also checked Stoneman meadow.

April 13 Bright, clear cool morning 6:30 A.M. Worked at museum readying weather equipment for field. Set up weather station 9:30-12:30 in Sentinel meadow. Hazy sun after 10 A.M. following clear morning. Warm, T-shirt weather out in the meadow (Gas 3.1 gallons Valley! $1.00)

Check along Glacier Point road 1:15-3 P.M. Cloudy sky, cool above 5000 feet. Left Valley 4:30 P.M. after getting 3.1 gallons Yosemite "liquid gold". Speedometer (750.1) Very

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April 13 - brief stop at Briceburg *Hydromantes brunus* locality. Much too dry on surface and under objects. Cloudy dull weather continued into evening but no possibility of rain, moderately cool. Stop at Mariposa for gas at 6:15 P.M. 14.9 gallons, speedometer (35796.4) Checked Mariposa Creek, a tributary ~~of ... creek~~ thereof, which runs SE through the west side of town, one block W of main street (Hwy. 140) Breeding toads present, also adult bull frogs along one stretch of the creek. Air temp. 7:15 P.M. was 13.2° C., mild breeze, still high clouds in sky. Left Mariposa Creek locality 8:35 P.M. and continued on Hwy 140 to foothills. Brief listening stops along road east of Planada. *Hyla* only heard, no spadefoot toads. Drove straight home to Berkeley after supper stop Merced. Arrived home 12:15 A.M.

April 26 Left MVZ 7:40 A.M. accompanied by John and Sarah Burns. Speedometer 36128.4, tank full 15.5 gallons, $4.60. Clear morning Berkeley area. Hills on east side as green as I've seen them. The effects of recent rains are evident in graze land west of the Sacramento Valley. ~~...~~ Little standing water in creek beds along road in the Valley. Merced 10:15 A.M. Cloudy over foothills of Sierra. We hit slight squalls of rain east of Planada, hail above 1000 feet.

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April 26 Patches of snow in draws and under the trees above 1500 feet. Intermittent light showers and sunshine at Mariposa where we made stop at noon. Bear Creek on way to Briceburg was clear, medium high - but some other tributaries high and muddy.

Collecting stop at Briceburg 2 P.M. Unsettled skies, cool. Ground quite damp from recent rains. Aneides, Taricha Batrachoseps, Eumeces gilberti, Diadophis, Rana collected but no Hydromantes. We checked one stretch of Hwy 140 a few miles east of Briceburg where heavy seeps forming small pools along road. One Taricha (juvenile) under rock. Nothing else. Snow persists on slopes above about 1500-2000 feet. Light snow falling just before we reached Yosemite Valley. The area has received much recent snow, about 6-10" stands on Valley floor. By 4:30 P.M. snowfall picked up. Snow ceased falling by 6:30 P.M. and by 9:30 the skies clear with early phase of new moon lighting Valley. Air temp. 9:30 P.M. = -0.2° C. Quick check of Stoneman and Sentinel meadows. Hyla chorusing. No toads heard or seen.

April 27 Water in jars kept in car froze solid last night. Today clear and sunny. Fast thaw apparent as early as 9 A.M. Check of Stoneman mdw 10-12 A.M. Most snow off trees by noon, and snow melted partially in meadow.

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April 27 We left Valley late afternoon. By 4:30 P.M. Stoneman meadow retains only small patches of snow. Sky remained clear thru evening. Mariposa at 7:30 P.M. About 8 *Bufo* and 2 *Rana catesbeiana* collected in creek SW side of town. Even cooled down to air temp. of 10-12° C. by 8 o'clock. Return Berkeley 1 P.M.

May 10 Left Albany 6:45 A.M. with Ross Hidy in his Pontiac. East Bay Freeway to San Leandro and Hwy. 50 east. Merced for gas and coffee 9:30 A.M. Great Valley clear and mild. Some standing water in creek beds and rivers medium high. Sierran foothills green from quite recent rains, skies clear. Made stops along Bear Creek near Bear Creek Inn on Hwy 140. Stream clear. *Rana boylei* seen. Hellgramites (sp.?) collected by rolling stones in swift water and letting them swoosh into a dip net. Merced River high, mostly white water. 6 rainbows, (to 12") 1 whiting caught with hellgramites and Super-duper lures in pools Indian Flat area. None others caught in deep pools above Arch Rock Ranger Station. Hidy took on 8" brook at Valley View. Yosemite Valley water table up, much higher than last summer. Falls loaded with rushing water, temp. in 60's late afternoon. Night check along Glacier

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May 10 Paint road 8:30-10:15 P.M. Snow drifts above about 6000 feet, over a foot deep Peregoy meadow at 7200 ft. Air temp. 2" above soggy meadow at 9:50 P.M. 1.5°C. at Peregoy mdw. Clear starry sky. No toads heard or could be induced to trill.

Returned to Valley 10:30 P.M. Toads emerged for breeding Stoneman and Ahwahnee meadows. ♀ and ♂ at Stoneman. About 20 ♂'s (no ♀) at Ahwahnee. All marked but one adult ♂ collected NE side of Ahwahnee meadow. Air temp. cold

May 11 6.5°C. at Stoneman 12:15 A.M. but water temps. closer to 10-11°C, Sky clear, no breeze. 3/4 moon illuminated much of Valley by 1 A.M. Next day clear and mild again. Snow is patchy on north-facing draws and slopes. Half Dome has patch of snow at this time; Cloud's Rest still blanketed.

Check of Peregoy meadow (necessary to unlock fire gate to get this far) about 10:45 A.M. Clear blue skies, temp. 9-10°C. (air). Melt of snow continues at fairly rapid rate, no toads.

Returned to shift max-min. thermometer from Sentinel to Ahwahnee meadow at 11:30 A.M. Toads still in ponds at Ahwahnee. Clear skies, bright sun, temp. about 15°C. (air) at 12:30 P.M. Clear, warm day continued into evening. Returned Berkeley 10 P.M.

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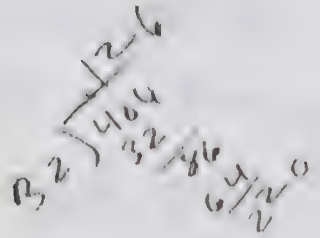
May 18 Left Albany alone in Plymouth at 6:10 A.M. Clear, mild morning Bay area. Took East Shore Freeway south to Davis St. in San Leandro, then cut east to Hwy 50. Low haze over Central Valley but clear skies and balmy temperatures. East side of Bay area hills still green. Irrigation water in Central Valley at good level, some standing irrigation pools. Rivers medium high water. Merced 8:50 A.M. Gas 9.9 gals. (36985.4). Stop about 2 mi. E Planada on Hwy. 140. Cattle watering trough and two shallow (to 3") muddy pools. No sign of anuran eggs or larvae. Stop by bridge (37005.2) where water standing in pools creek bottom. Cattail marsh deeper (2') ponds. Bullfrog larvae (2 taken) very abundant along with adults. One Sceloporus noosed. The Orange-spot place on 140 (37008.1) and Hornitos road (12.9). A ♀ Sceloporus hit on road about 2 miles N of Mariposa cutoff (Hwy 140 to 49) at 11 A.M. Day continued clear and hot, but fence lizards not abundant along highway. Fished a couple hours between Indian Flat and Briceburg. Super-duper raised 4 trout, only one hooked and it lost. Trout demand fast action of lure, not slow drawing it in after cast. Clarence "Red" Welby (sp.?) morning cook Lodge Cafeteria, stopped and chatted. Local men connecting with yellow salmon eggs and worms. I had no luck with worms and/or spinner. Merced high but quite clear for this time of year. Drove into Yos. Valley 3 P.M. Still warm and clear.



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May 18 Worked Ahwahnee meadow 4:30 - 6:30. Few toads out and marked these. Night check of Ahwahnee, Stoneman, Sentinel meadows 8:45 - 12 midnight. Air cooled down to 9+ °C. but sky clear and star-

May 19 lit, no breeze. Slept Camp 4. Morning check of Ahwahnee mdw. 7:30 - 8:00 A.M. Air temp. 10°C started early during check at study site. Clear blue skies, no breeze, it may be a scorcher. Fresno was supposed to have 90+ yesterday.

~~May 19~~ Still, clear, sunny 9 A.M. Up Glacier Point Rd. Chinquapin (96.3) First stop (99.2) Black-headed grosbeak along road 5500 ft., many robins.

Second stop (99.6) 3 Ensatina, Rana muscosa tadpoles.

Bridalveil Bridge to mono mdw. trail 2.0 road miles. no time to hike into mono mdw. this trip. Small meadow W side of road 1¼ miles by road NE of Bridalveil Bridge. no toads.

Returned Yos. Valley and went Big Oak Flat road to Crane Flat, then Tioga Road as far as Gin Flat. Arrived 3:15 P.M. Clear skies, warm & sunny. Return Gas Mariposa 8 P.M. 12.5 gallons $4.06 (7210). First night stop 18 mi. (road) W of Mariposa. Balmy evening. Bullfrogs only heard. 10 adults collected for culinary purposes. Doubled back eastward on Hwy 140 to Cathay. Took road to Hornitos, Merced Falls, Snelling, Turlock. ~~—~~ Night road check 9 - 10:30 P.M. along narrow black-top road elevations 300 - 1200 feet. Air cool, high 50's F°, but pavement warm after hot

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May 19 day. Only herp on road was one adult ♂ bullfrog taken near Hornitos. About 10-12 live Dipodomys, 6 Peromyscus, cotton-tail rabbit seen. Pavement bare-dry. Agricultural graze land along road with fence-lines heavy with vegetation. Reptiles probably seldom seek the road at night this situation. Turlock, Modesto on U.S. 99. Then 132, 33, Hwy 50 Tracy, San Leandro, freeway to Albany. Arrived home 2:10 A.M.

June 4 Left Berkeley 4:10 P.M. accompanied by Drew Hidy in Plymouth. Initial mileage 37838. Clear hot day. Hills east of San Leandro dry & brown. Temperature 95°+ in Valley late afternoon. Gas Modesto 14.1 gallons (37927) at $4.40. Last time tank filled Berkeley 37700. Arrived Yosemite Valley 10:45 P.M. (One gopher snake collected 2 mi. W of Mariposa on Hwy 140 - live adult) Evening clear and mild. Camped at Camp 15. Early morning serenade by Sierra chickadees, black-headed grosbeaks, steller jays, robins.

June 5 Checked weather station Ahwahnee Mdw. Clear, cool morning but sun hit Valley about 7:30 A.M. (D.S.) Bufo toads observed. Afternoon trip up Glacier Point Road, then trail to Mono Meadow, an old canorus locality. Rana and Thamnophis only - not a sign of toads over a meadow area fully 3/4 mile x 200-300 yards width. Some high clouds but mostly sunny, hot, no breeze. Time 2-4 P.M.

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June 5 Brief stop at Peregoy meadow. No eggs or tads upper (N) side of road. max-min. thermometer checked & removed. Little bird life observed but many signs of active rodents. Bullock's (?) oriole seen from distance near meadow.

Return Valley for supper. Night check 10:00-11:15 of Ahwahnee mdw. Clear, mild, still evening. About 7 toads marked, one recaptured.

June 6 Yosemite Valley. Clear, still, hot day. Worked Ahwahnee meadow 10:45 - 12 noon. Tads collected, pictures taken. Air temp. about 85° F. before noon.

Left Camp 19 Yosemite Valley 2:30 P.M. (38124)

Gas stop Carroll Cafe on road to Bass Lake (38170) 14.8 gals. at $4.61. Car boiled up on road climbing up from Auberry. Speedometer 38209, One Gerrhonotus multicarinatus collected. Huntington Lake 28238. Warm clear evening. Camped at Deer Creek Camp. Night check 9-10 P.M. but no Bufo. Hyla and Rana muscosa taken.

June 7 Recorded reel #1 Folkways Inc. tape recorder from 5:40-6:20 A.M. Cool, still morning. Temp. 7-10° C. (see Recording notes). Left Deer Creek Camp 8:45 A.M. for Kaiser Pass. Arrived 9:30 A.M. warm and mostly clear except for high billowy cloud. Collected Kaiser Peak mdws., 8000 ft 9:45 - 11:30 A.M. Then Kaiser Pass mdws. Recorded reel no. 2 of canorus Over 2 dozen adult toads collected plus eggs, 1 juv., Rana (& eggs) Hyla. Breeze came up about 1 o'clock.

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June 7 Sierra rosy finch (2), juncoes, white-crowned sparrows in Pass area. Returned to Huntington 3:30 P.M. to work on specimens, cook supper. Western tanager (2) heard & seen. motorboat on Lake prevented recording it. Left Billy Creek Camp on Huntington 8 P.M. Drove Hwy 168 to Fresno by 10:15 P.M. Hot (in 80's) in Valley. Stayed overnight at L.D. Moores.
(38355)
June 8 Left Fresno 8 A.M. via Hwy 180 to King's Canyon. Hot morning, clear and still. Excellent highway into Park. Valley floor and low foothills very dry. Good transition zone not reached until well over 4000 feet elevation. Shrikes, scrub jays, Calif. woodpecker, linnets seen Upper Sonoran zone along road.
Talked with Stanley H. Bechtel, Dist. Ranger, K-C Natl. Park at Entrance Station. He reports toads out at night in residential area here at Grant Grove (where I'm writing this). He dimly recalled seeing toads in Roaring River Canyon which runs N into S Fork of Kings River. One of his men is going into Canyon there in 10 days. Bechtel promised cooperation in getting toads (or pictures) for me. Write care of K-C. I gave him my name and Yosemite address.
Grant Grove 10:30 A.M. Warm & clear. Took Kodachrome #25 from near Buena Vista Peak facing Ex NE toward High Country above Kings Canyon. This Granite Lakes area should be checked someday for Bufo canorus but we do not have the time to pack up into this area. We took dirt road heading NE to

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June 8 Horse Corral meadow, about 7600 ft. (415.8) Stop at Big meadow to talk to people living there. Two middle-aged (?) ladies Madeleine Cochran (Col. '24) and Jera Chism (Col. '22, an entomology major then and now teaching grade school Tulare) informed me that in 20 years of hiking this back country they had not seen true toads. They did know Hyla and Rana by common name. Big mdw. has Rana muscosa and Hyla, according to their description. Continued up rugged one lane road to Sam Davis Bar 7 Pack station (425.9). Young packers had no knowledge of herps. They did say that this country has just been freed of snow in last few weeks. Car parked beyond Horse Corral mdw. (427.8) Lodgepole pine, Jeffrey pine, ~~fat~~ red fir forest. Wet typical Canadian zone meadows used for grazing stock. Bufo boreas tadpoles taken. Also about a dozen young rainbow trout for our ~~dinner~~ supper. Weather continued clear and hot. Night collecting Horse Corral meadow yielded 4 adult toads, 3 Thamnophis elegans and one Rana muscosa. Clear, still moonlit evening. No toad calls, however.

June 9 Clear, mild morning. We camped at site along Big Meadow Creek just W of Horse Corral meadow. Maximum-minimum thermometer registered a low of 41° F last night. After breakfast we hiked about 2½ miles NE to Summit ~~Grant~~ meadow, 8100 ft., a high Canadian zone meadow near Lookout Peak which ~~just~~ overlooks Kings River Canyon. Batrachoseps attenuatus taken low (on altitude

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June 9 record for the species of some 2000 ft. Weather clear and warm. *Rana* and *Hyla* collected. Black-capped chickadees, mt. bluebird, Olive-sided flycatcher (probably) - high in fir snags, loud song. Meadow appears not suited for toad breeding. Hiked back to Horse Corral meadow. Drove back out narrow rough, one lane road to Sequoia highway. Arrived Giant Forest 3 P.M. Drove truck road up to Long meadow, a reservoir area at bottom of Wolverton Creek. *Bufo boreas* tads here. We back-packed up about 5 P.M. 4 miles to Heather Lake in attempt to trace toads back up into high country around Table meadows, 10,000 ft ±. Snow drifts along trail above 8000 ft., heavier drifts around Heather Lake which was 2/3 rds frozen over. It's too early to work this high country. We arrived at high point (9458') above Heather Lake and made a hurried camp at 7:45 due to approaching darkness. Clear night with minimum temp. of about 2-3° C. (estimate).

June 10 Hiked down 8:30 A.M. to Heather Lake but Lake frozen. Marmot seen edge of Lake. Tried fishing but difficult to get line into water through thin glaze of ice. Fishing party of two in previous day got limits of brooks in 3 lakes up here. They reported sighting 20" brook trout in Heather Lake. Roger Anderson down below at Long meadow confirmed presence of such monsters. This is really rugged Hudsonian zone country. White bark pine dominant tree but lodgepole, red fir persists up here. Mt. hemlock abundant. Nuthatch, [illegible]
Mountain chickadee, Junco

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June 10 Hiked back down to Long meadow ~~at~~ arriving 12:45 P.M. worked meadow for couple hours. Rana adults and Bufo toads taken. Cooler today with brisk SW wind but clear skies. Cleanup, work up specimens, notes at Kaweah Campground. Night check of Crescent meadow 7:30 P.M. Rana only seen. Doesn't appear to be a good Bufo meadow. Climb of Moro Rock to watch sunset. A highlight of trip. Night check of Long meadow 9-10:45 P.M. 8 toads taken.

June 11 Kaweah Campground. Female bear raised all kinds of hell last night. She broke open our metal food locker while we were out doing night work in spite of close proximity of our camping ~~next~~ neighbors. During the night she batted down a cache suspended 6-8' above the ground by nearby campers, ate up over $5 worth of their grub even to tearing open the canned goods, broke window in sedan, climbed in and took out food. She just wouldn't close. I got recording of her grunts while treed 5:15 A.M. Later we discovered her 2 cubs in 50' tall white fir. We wouldn't have been so brave! Gas 14.5 gals. (4.60) Porterville. mileage (38557) at 12 noon. Lunch here. Took road from Ducor to Glenville (~~poorly~~ poorly marked) then over Greenhorn mts. to Isabella Hwy 178 over Walker Pass to U.S. No. 6 Groceries & supper at Inyokern after arriving 5:15 P.M. A nice drive up through Upper Sonoran into Transition of Greenhorn Mt. State Park area but very slow and winding. Very dusty from Summit Lodge to Isabella reservoir. Excellent highway rest of way. We made a couple

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June 11 of very brief log-rolling stops enroute. One *Eumeces gilberti* collected 6 miles NW of Glenville. Other skinks seen. Very dry under oak logs. Cedar Creek up toward Greenhorn Park had some water. We hit it lucky weather-wise. Heat wave subsided yesterday. Valley today a high of 80+ with steady breeze, intense up toward Walker Pass area. East side of Onyx had extensive cattail marsh with redwing blackbirds breeding there. We did not jump fence to check for toads. Warm windy and dry here in Inyokern. Grocery & supper stop here. At dusk about 8 P.M. we started driving roads in search of reptiles. Unfortunately the weather has cooled off past couple of days. Brisk winds have kept roads from warming up sufficiently. Blacktop temp. 8:20 P.M. about 23°C. Return to U.S. 395 then road up Grapevine Canyon. One adult ♀ *Bufo* on road. Hyla calling.

June 12 Slept along highway N of Olancha, Inyo Co. Gas stop Lone Pine 13.0 gals. ($4.55) mileage 38882 at 8:15 A.M. Clear warm morning Owens Valley. From Independence we drove up steep narrow mountain road to Onion Valley 9000+ ft. Somewhere in this canyon McQuester (White?) 1912 caught a *Bufo* in mammal trap. Locality vague ("Kearsarge Pass"). It could have been Onion Valley or even lower. I talked to Vic Taylor who has worked this area for 30 years. He claims to never having seen a toad above the Owens Valley area, and he has seen many around Independence. Local information on toads is extremely spotty as evidenced by my Kings Canyon (Big meadow) information of last week. Drew and I parked

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June 12 a lunch and started up toward Pothole and Heart Lakes at 11 A.M. Dry, clear windy day. Cool at this elevation. The first large lake up toward lake is Gilbert Lake but a small 75 yards across lake is 2½ miles by trail above Onion Valley. Elevation 10,000 feet. Some patches of snow on southern exposures, heavy willow growth, boggy at lake margins. No signs of Orchards at all. We fished inlet flow and got 7 small brook trout to 6". 1:15 P.M. hiked another ½ mile to Gilbert Lake, 10,400 ft. Heavier snow to 3-4' at southern edge of Lake. Again no Orchards. We hiked back to Onion Valley late afternoon, fixed supper and checked meadow area. Cool, windy. Stock watering pond near Holl's Pack Station, boggy lower part of meadow. Creeks charge into Valley from three directions. Vic Taylor, associated with packing outfit here, told me lower meadow was boggy late into summer. We found no Orchards. Wild onion, sedges, much willow growth in meadow. Drove down canyon 7:30 P.M. Grays meadow 6800 ft. on way out has Independence Creek rolling swiftly through it. Doesn't seem suitable for toads (?)

Stayed overnight Dick Jacksons in Bishop after buying new recap tire in Big Pine.

June 13 Recap went bad on return trip to Big Pine. The garage man had missed a second leak in the tube. 11:15 A.M. (38895) Took road N of Big Pine over Westgard Pass. Mostly clear, hot, light breeze. Stop made at Batchelder Springs 7 mi NE of Big Pine. Old cabins, springs here. Sceloporus -

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June 13 occidentalis (6), S. graciosus (3), Uta stansburiana (1) taken. Half dozen Cnemidophorus seen but they eluded our nooses. Arrived at Deep Springs School (The P.O. of wagon) at 1:15 P.M. A lady there directed us down southward through school property to the Lake. We skirted the Lake to the N and W. No sign of water although presence of Juncus in patches indicated some recent moisture. The Lake is a completely dry salt bed. Finally we observed green pasture with cattle grazing on it about ½ mile N of the dry Lake. Difficult driving the rutty "roads" here with a low-slung station wagon. The springs form a regular marsh habitat here with sedges forming extensive clumps. The marshy area measures about 40-50 yards x 75 yards with some deep pools to at least 3-4 feet depth (see Bufo notes). It was hot and dry sage until sunset around 8 o'clock. A brisk breeze blew across the Valley floor. Drew Hinds found a single adult exsul at 3:45 P.M. in a water-filled hoof depression made by the cattle now grazing in area. I began recording red-wing blackbirds and yellow-headed blackbirds at about 7:15 P.M. Later we collected 14 B. boreas, 1 Scaphiopus adult and samples of larvae of each. Night temperatures cooler about 9 P.M. 15.8° C. We drove northward the 6 miles to the School and then took the main road out Westgard Pass to Bigpine. There is an approach to the Lake from the ~~State road of~~ main road at the more southwesterly end of the Valley but our

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June 13 information from the lady at the School was that the road was almost impassable. I can believe that after we almost bogged down trying to reach the Lake from the north and east approach. Slept along road near Big Pine. Single ad B. boreas taken roadside just north of town at 10:55 P.m.

June 14 Drove into Bishop to clean up and get breakfast. Gas 12.5 gals., $4.70 (38986.9). Clear sunny morning. We climbed up Sherwin Grade in Mono County. These are MVZ toads from Little Round Valley. From near McGee Creek Resort on Hwy 395, Mono Co. ~~the~~ a dirt road winds up 3 miles to McGee Creek Pack station. I talked with Russ Johnson of ~~San Diego~~ San Diego, owner of the station. He identified a Bufo boreas I showed him as the kind he had seen near his springs a few days ago. The canorus? and hyla were forms he recalled seeing up at higher elevations. If his sight record of boreas is correct then it would place the species above 8000 ft. We checked pasture meadow, the springs for signs of eggs or larvae. No luck. Warm sunny day with moderate breeze. It's possible to drive ½ mile farther up Canyon. Stream bottom here choked with willow and aspen. Returned to highway 2:30 P.m. and drove S on 395 to Toms Place for groceries. Golden eagle at 8000 ft. along road. Then we drove up dirt (fair shape) road to Rock Creek Lake, 9727 ft, Inyo Co. Camp at small lake just below the large Lake. Looks like canorus habitat but no luck. Night check negative.

June 15 Camp at Rock Creek Lake. Recorded bird calls 8-8:30 P.m.

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June 15 last night. We spent 4-5 hours in vicinity of Rock Creek Lake. Fished the creek cascading into SW end of Lake, got nice batch of 9-12" rainbows using stonefly nymphs gotten under rocks in stream. Little good *canorus* meadow available around Lake. Drew took one ♀ *canorus* near a boggy side course of creek. mostly clear skies but windy and cool (17-18 °C.). no snow left in open areas around the Lake. We checked two meadows along the way. *Rana* only. returned to Hwy 395 3:30 P.M., grease job at garage Tom's Place (39050). Sounds like worn tooth in gear box. Hwy. 395 to Devil's Postpile via Mammoth. Clear and cool weather. Considerable snow on slopes of Mammoth Peak. Red's meadow area clear of snow except for tiny patches up under trees. Camp at Reds mdw. Campground, 7500 ft. night check 8:30 - 9:45 P.M. of area W of Sotcher Lake, Tourist mdw. and Government mdw. (last near our camp). *Hyla* (few) calling. Some *Rana* seen but no evidence of *canorus* activity. Water temp. 15.8 °C. one pond (boggy) area; air 7-9 °C.

June 16 more extensive check of same meadow areas. Also meadow area around Ranger Station near the Postpile. Clear cool after a flurry of hail and rain last night after 10:30 P.M. no signs of *canorus*. Black-capped chickadees in willows along Minaret Creek. (see recording notes for birds). We walked two more meadows along road on way out of Postpile area. *Rana* young, *Thamnophis elegans* (2) but no toads. Too early?

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June 16 Left Postpile area 2:30 P.M. and returned to Hwy. 395, drove north to Leevining. Windy and warm. Gas 10.4 gals.
3.85 (39137). Groceries. Up Tioga road to Tioga Pass 5:15 P.M. Driving SW breeze, cool but mostly clear. Snow in patches. Tioga Lake at higher level than I remember it being last summer. made check for toads 5:45-6:30 P.M., set out max-min. thermometer at Entrance Station and put Taylor thermograph out in meadow area. Bob House and Ferdinand ?, Rangers on duty, promised to daily record high-low air temps. 3 ♂♂, 1 ♀ seen in study area. no eggs or calling - canorus emergence recent. Hyla calling but their breeding just begun. Left Pass 8 P.M. and drove directly to Valley. mileage end of trip. 39215. Total trip mileage Yos. Valley & return 1091 miles. Camped at Camp 19.

June 17 Worked at museum morning. Checked abundance under. station 11+ A.M. Clear, warm, slight breeze. Return to Berkeley 6:15 P.M. after hot trip thru Great Valley. Animals made trip without fatality. High of 90+ °F modest today but breezy.

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June 23 Left Berkeley 1:40 P.M. driving alone in Plymouth. Clear mild day with brisk westerly winds. Gas 14.9 gallons. (4.42) at Berkeley (39543). Merced 4:15 P.M. Groc. #7.83. Gas 6.7 gal. (#2.01) 39666.4 Valley hazy sunshine, strong winds, warm but not hot. Arrived Yosemite Valley 7:45 P.M. Set up camp at Camp 19. Brief night check of Ahwahnee mdw 10:15 P.M. no toads.

June 24 Check of weather station Ahwahnee Meadow 1:40-2:30 P.M. Start for Tioga Pass 4:15 P.M. Picked up back-packer Mark Hipsett, recent graduate San Jose high school, at junction of Tioga Road & lower Yosemite Valley. Mark after hearing of my research asked if he could bum along. We camped at Porcupine Flat campground, working area S of Creek before & after supper. Evening check 9:15-10:05 yielded tadpoles but no adults. Cool, cloudy evening with air temps. 7-8° C.

June 25 (Gas (10 P.M.) 15.0 gallons Holbrook Jct. on U.S. 395 in Nevada. #5.25. (39904.6))

Morning check at Porcupine Flat. Clear, cool morning. Still no adult *Bufo* 8:15-9:00 A.M. Sierra creepers, chickadees, purple finches, woodpeckers (sp.?) seen & heard around campground. We pushed up to Tuolumne 10 A.M. Meadow clear of snow & brownish. No toads left side of road as we drove grade down into meadow. 1/4 mile S of Tioga

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June 25 Pass Ranger Station 10:45 A.M. B. canorus adults, Rana muscosa, Hyla collected. Clear skies, cool, and very windy. We worked until 5:45 P.M. tagging 27 adult and subadult toads with Co^{60} lead pellets. Tag thermograph serviced. Tadpoles noted many ponds but no freshly laid eggs at the Pass study area. Drove to Lee Vining 6:30 P.M. then N on 395. Cooked supper Walker Canyon area, checked one pasture pond about 3 miles south of Cal-Nevada border. No anurans. Nighthawks (sp.?) 3-4 seen flying over road. Overnight stop at Holbrook Junction.

June 26 Drove south on 395 past Topaz Lake. White pelicans, Calif. gulls on Lake. Took good paved road (finished last year, according to Holbrook Jct. proprietor) past Heenan Lake to Route 4. Hyla only Heenan Lake, one Thamnophis. Dead adult Bufo canorus collected right at Ebbetts Pass. Clear day, sunny. Highland Lakes road about 2 miles W of Ebbetts Pass (39945.9) Stop about 2.4 miles S of Jct. Highland Lakes Road and Route 4. This is place Robert Livezey got B. canorus thus extending range northward. Tadpoles and one yearling collected here (948.2). Air temps. 17-18° C., clear skies, moderate breeze. No adults out or taken under objects.

Next stop (950.1) 1:50 P.M. Vast open meadow, buildings, probably a park station. Seepage streams and flow abundant down low gradient meadow. Tadpoles taken of smaller size. Probably colder here since more of a bowl effect

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June 26 due to protective ridges. Snow on N-facing slopes but none in meadows. Rana abundant but no Hyla toads.
(951.4)
3 P.M. We reached Highland Lakes. Clear skies but very strong cold wind blowing over the Lake. We worked NE end of Lake. Adult, juvenile B. canorus taken but no young or eggs. The last three canorus localities give an excellent idea of effect of altitude and temperature on breeding + development. Some snow patches left in meadow area, larger drifts on slopes. Hank climbed up unnamed peak on east side of Lake. Here at ft. he collected two more adult ♀ canorus. One definitely swollen with eggs.

5 P.M. We returned to route 4, over Ebbetts' Pass to Markleeville. Groceries $1.97. Then to Woodfords up Carson Canyon to Williams, then left to ~~Faith~~ Hope Valley. ~~Valley~~. Pasture ponds + stream flow checked ~~Faith to~~ along the road. No canorus. Supper 7 P.M. at Hope Valley public campground. Evening drive and check of ponds adjacent to road Faith Valley. Evening cold (8-10°C) and unproductive. Rana only seen. Camp along road about middle of Faith Valley.

June 27 Recorded end 300 feet of reel no. 7 7:30-8:30 A.M. White-crowned sparrow, purple finches, etc. Check of 4-5 meadow ponds in Faith Valley. Hyla toads only. Large herd of cattle trampled watering ponds but still good breeding water available.

Bufo boreas tadpoles collected Charity Valley, 7700 ft. in large deep pond E side of road. 10:30 A.M. ~~that~~

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June 27 Warm clear skies, mosquitos ferocious! no adults. Rana collected. Brewer's blackbirds nesting in area.

Next stop about 3/4 mile E x S E the nipple, 8200 ft. Hork collected a subadult Bufo boreas in a pocket gopher hole. This is close to an altitude record for boreas in the Sierra, to my knowledge, and places boreas 9 airline miles north of Ebbett's Pass canorus at near equivalent elevations. We turned off Blue Lakes road to Indian Valley. Fair dirt road (not on old topo sheet) was passable to within a mile or less of the lakes in Indian Valley. A stream crossing gullied deep stopped us. According to the sign this road goes thru to Markleeville. Day continued warm and clear. We hiked into Indian Valley, 3 P.M., across it to an old cabin, then checked a number of canyon draws on E side of Valley. Sagebrush over much of slope, some streams flowing but slight. This appears to be too arid a basin for toads. Hyla and Rana were present in the lake margins and at shallow meadow ponds just W of the lakes. Kodachromes #2 & #3 facing S across Indian Valley. Supper at Lower Blue Lake, a rocky margined artificial-looking basin. Returned to the nipple locality 8:00 P.M. where we collected one adult toad. No others seen and no calls. Search of Charity Valley pond locality fruitless 9 P.M. but a single subadult found on road 1/4 mile from the pond site on road to Faith Valley. We continued drive through Faith Valley and reached Highway 88 9:35 P.M. During drive down West Carson

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June 27 Canyon we saw two adult porcupines at edge of road. They climbed quite agilely up steep dirt & rock banks. Slept overnight Gardnerville (40058.1) (0060.)

June 28 Gas Gardnerville, Nevada. 11.0 gals. $ (3.60) plus tire charge & balancing $2.00. ~~Tread~~ Ply separation on new Ward's left front tire left wicked bubble which kept our speed down last night.

Hwy. 395 to Leevining, then up Tioga road to Dana meadows at the Pass. Herb and I tried geiger counter method of collecting the toads marked last Saturday. 3 tagged adults retrieved in short time, air temps. 19-20° C., wind gusty, sky clear 11 A.M. Left Pass 12:15 P.M. and drove to Porcupine Flat Campground where I dropped off Herb Lippett. He intended to cover this area and Tamarack Flat before leaving on Friday or Saturday.

July 8 Left Camp 19 Yosemite Valley 5:50 A.M. for Tioga Pass. Cool, clear morning. Arrived Tuolumne mdws. 7:30 A.M. Coffee in store tasted mighty good! Gas 5.0 gallons at Station. Worked Pass 8:30 - 2:30 P.M. mostly clear skies but scattered high clouds later. Morning mild for Dana meadows. The wind came up strong by 9:30 A.M. and remained high rest of time I was there. Returned to Valley 5 P.M. where I checked Ahwahnee meadow station.

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July 19 Left Yosemite Valley 5:30 A.M. with Paul Elkins. Clear cool morning. Arrived Tioga Pass 8:10 A.M. after breakfast stop meadows. Mild, windless morning with air temperatures 17-18° C. Toads already active at surface or emerging from burrows. Light wind by 9:45 A.M. Sky ½ clouded high cumulus formations. Mosquitoes vicious! Tagged toads # 37-58 with Co^{60} tags. Left Pass 11:30 A.M. and drove directly to Gardnerville on U.S. 395. Hot, dry day. Hwy 37 to Woodfords, # 88 up into Hope Valley 4:30 P.M. Drove directly to Nipple Locality on road to Blue Lakes. No signs of *Bufo* here. Check of Charity Valley Road on return 5:50 P.M. No toads or juveniles here. Tadpoles found along stream in Faith Valley 6-7 P.M. Cooked supper here. Night driving back to Woodfords and Hwy 4 to Hermit Valley on west side Ebbetts' Pass. Camp here.

July 20 Paul and I drove about 4 miles westward 8 A.M. on Hwy 4 to lower end Hermit Valley. We finally found the Indian Valley trail (a jeep had been over it this year) and hiked about 2 miles by trail N x NW of Hwy 4. *Ambystoma macrodactylum* (4) and *Bufo boreas* tadpoles in pond along trail. Returned to car and drove up to Highland Lakes up Hermit Valley. Check of Highland Lakes Road *canorus* localities. Direct return to Yosemite via Hwy 395. Continued clear & warm.

2 newly hatched (?) Tioga Road near Porcupine Flat 8000 ft. 7:35 P.M.

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Aug. 9 Brief trip to Tioga Pass with Bob Mogell of California Radiation Safety Lab and his family. Left Valley 10:45 A.M., arrived at Pass 2 P.M. after lunch stop meadows. Bob brought up sensitive ~~set~~ scintilometer which he tried with little success before the "receiver" was broken by jarring it. Returned to Valley 6:30 P.M. after nice outing for both our families - little data for me. Thermograph serviced. Hazards of radioactive tracing (see species account of our detecting a "hot rock") uncovered.

Aug. 30 Left Valley 6:20 A.M. accompanied by Dick and David Hartesveldt and Paul Elkins. We left Dick off near Erratic Dome at West side Tuolumne mdws. and continued to Meadows for breakfast. Arrived Tioga Pass 8:40 A.M. Weather cool but clear and little air movement. Toads probably just emerged this time. Wind picked up by 9:30 A.M. although day clear and warm. Removed weather station pond A. Tagged toads T67-84, four with radioactive Co^{60} pellets. Returned to Valley 5:20 P.M. I talked with Don Mullally, U.C.L.A. while at Pass this noon. See species account.

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Oct. 7 Left MVZ at 2:45 P.M. accompanied by Bill Hamilton. Stop Radiation Safety Lab at Cowell to pick up 2 geiger counters and a Scintillometer. Finally collect Gerald Robinson at his place and headed out Hwy 24 to Walnut Creek at 3:40 P.M. Clear, mild weather. Great Valley appeared quite dry. Supper at La Paloma in Merced 7 P.M. and pushed up Hwy 140 to Yos. Valley. Clear cool evening. Spent night at Rangers' Club in Valley.

Oct. 8 Rolled out 6:45 A.M. and headed after Lodge breakfast (courtesy Clarence "Red" ~~Woelling~~ Woelbing, breakfast cook) to Tioga. Dead poor-will collected on road to Crane ~~F~~Flat about three miles from that Entrance Station. Arrived Tioga Pass 9:10 A.M. P.S.T., clear, cool (48° F. at Station) with brisk southerly wind. Worked study area almost continually with Scintillometer and two geiger counters for total of about 16 man-hours. One adult ♂ canorus picked up by sight (toe-clipped but no Co^{60} tag) Six juvenal canorus and a few Hyla young-of-year also taken. Mountain bluebirds, juncos, a robin (sighted by G. Robinson) active in area. Red-tail hawk and a sharp-shin spotted on way up to Pass (above 8500 ft.) about ~~8:30~~ 9:00 A.M.

Left Tioga 6 P.M. for Valley. Night checks (brief) of Ahwahnee area, Stoneman Mdw 9:00-9:45 P.M. No toads (see B. boreas notes)

Oct. 9 Left Valley noon after working museum. Berkeley 6:30 P.M.

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Journal

Oct. 21 Left MVZ 6:30 P.M. in my Plymouth accompanied by John and Sarah Burns, Jim Anderson, and George Heinsohn. Supper at Paul's Grill on College Avenue in Oakland upon recommendation of George. $1.35 filet mignon wonderful! Hwy. 24 to Walnut Creek, then south to U.S. 50. Moderately cool, clear evening in Great Valley. Gas and coffee stop Merced 11 P.M. Entered

Oct. 22 Yosemite Park 12:30 A.M. Young gray fox sighted along road above Cascade 12:45 A.M. about 3200 feet elevation. Overnight stay at Rangers Club. Breakfast Lodge Cafeteria 7 A.M. Gray squirrels, deer abundant and active Valley floor. Citellus beecheyi (4-5) along road between junction Big Oak Flat Road — Hwy 140 and 2nd tunnel (between 3500 - 4500 feet). We spotted a mountain coyote on Tioga Road near where the South Fork of the Tuolumne intersects it, elevation about 6500 ft. The coyote quickly loped out of sight among boulders and trees as we approached by car. Day mild and clear. Quaking aspens in full fall color. Very few deer seen at higher elevations. We arrived at Tioga Pass 9:45 A.M. Air temp. about 10-11°C. but little breeze. Clear azure blue skies - no clouds. A moderate cold wind sprang up from the north (first north wind I experienced at Pass) about 10:30 A.M. Considerable difference in air temperature between

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Oct. 22 colder exposed ridge and protected draws. Some snow and rain during past couple weeks (see Station weather data) has resulted in moist soil lower meadow area. Shaded gullied edges had frost until late morning (10-11 A.M.), and there was a good ¼" of ice encrusting edges of the moving rivulet and the wet bottomland on the west side of pond A. A few thin patches of snow still existed in shaded exposures around the study area. Dana, Mammoth and other peaks have retained snow from storms initiating winter snow blanket.

Others in party went pika hunting on west talus below Mt. Dana at 3:30 P.M. Jim Anderson heard but a single cony. Clark's crow, juncos only bird species observed at Pass. Belding's ground squirrels not in evidence at all. No marmots or chipmunks seen. 3 Thomomys trapped in study area along with 3? Microtus, the latter along the flowing rivulet. Left Pass 5:45 P.M. for Valley. No deer seen above about 7000 feet along road and relatively few (5-6) until we arrived in Valley. Adult porcupine observed on road 3 miles SE of Crane Flat, about 6000 feet. 7:30 P.M. Set trap line Ahwahnee Mdw. (9-10 P.M.) and surveyed for toads (none!) cold -5-6°C. - clear evening.

Oct. 23 Worked around Yosemite Museum until 11 A.M. 2 specimens of great gray owl were in research room (see notes). Return Berkeley mild fall day by 6 P.M.

Field Notes 1955

Species Accounts

Amphibians

Bufo boreas

Bufo canorus

miscellaneous

Reptiles

Birds

Mammals

Amphibians

Bufo boreas

EL Karlstrom
1954-5

Bufo boreas

Jan. 10 1.3 mi. N, 0.2 mi. W Civic Center, Richmond, Contra Costa Co., Calif. Visited this area following heavy weekend showers which ended sometime during morning hours. Today the weather has been overcast and windy — cool temperatures as we've had for many weeks. Water temp. 4:30 P.M. 11.5° C., air above damp grass 11.0°C. Overcast, but intermittent sunshine along with cool winds. Ponds high with water. Few Few Hyla males out and spasmodically calling but no eggs laid as yet. Some Hyla under board litter, few Batrachoseps but no Bufo.

Feb 1 Same locality. Checked very large pond to W side of N-S running SP tracks. Hyla in raucous chorus. males near edges, on vegetation or litter surface farther out in water. Water temp. 7:35 P.M. 9.8° C., air 2" above water 8.2° C. Air over dry grass surface 5.8° C. Moderately NW breeze, clear sky, bright 3/4 moon. Water level up about 6" from last visit, and this pond probably 10-15 yards wider than in January. no sign of toads or eggs. Air temperature predicted 35-40° tonight, feels it now here. It seems too early for toad breeding. Hyla egg deposition has just begun as evidenced by half dozen egg clusters recently deposited. (See Hyla notes)

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Bufo boreas

Feb. 10 1.3 mi N, 0.2 mi. W Civic Center, Richmond, Contra Costa Co., Calif. Set up the soils-type thermograph to record water temps. at bottom of pond 4" water depth (setup described later). Also placed one max-min. thermometer inside the wooden chest housing the thermograph. Checked setup at 4 P.M. Also pounded a broom handle into the pond and marked present depth. The pond level is down 1 inch from its apparent high Feb. 1. The large pond W of the N-S running S-P tracks is still high, 116 yards long and about 85 yards wide (E-W). Photographs taken with 4x5 Voigtlander camera from elevated points S and SE of the pond. Plus-X, #9, 10, and 12. 1/100th second at F11 to F16 late afternoon sun, some haze, about 4:15 P.M. #11 taken of part of pond on east side of built-up railroad right-of-way, facing NE, the part of pond where toad tads seen previous spring. Trailer court in background.

Water temp. 15.2° C. at 4:15 P.M. 1" below water surface where pond 3" deep. Air temp. 14.8° C. 2" above dry grass beside pond. Some evidence of additional *Hyla* reproduction as more egg clusters observed (see *Hyla* notes) but no sign of toad eggs or adults. A young 12-year old claimed he saw strings previous year of eggs in large pond W side (where I have temperature equipment). I hope he's correct, and they lay here again.

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Bufo boreas

Feb. 10 Richmond, Contra Costa Co., Calif. — weather today feels like spring on its way - sunny, mild, with moderate to brisk NW breeze. The pond is fairly clear except for south end where prevailing winds have forced scum. Algae production moderate, no real bloom, but appears to be rising. Aquatic insects (diving beetles, etc.) occasionally seen.

Feb. 15 Same locality 8 P.M. Clear skies, cool temperatures. Toads have emerged for breeding. Two high school youths were in process of stoning five adult ♂'s on small road N of ponds as I arrived. One died during night, others managed to crawl away. Light behind building (manufacturing plant A.T.S. and Fary Co.) seems to have attracted toads here for feeding. Water is about 30-40 yards from this grassy area. Pond W of Santa Fe tracks is Pond A (where I have thermograph - see map). Pond B is E of road-bed.

Russell, Joe Hall, 2 high school boys aided in census of ponds. 2 adult ♂'s seen in Pond A at NE quadrant. 24 ♂, 2 ♀ handled at Pond B and practically all were at southern end where water depth less than 10-12" for most part. 2 pairs in amplexus but no eggs. Pond A water temp. 13.8°C., air same at 8:45 P.M. All toads left to breed. Charcoal

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Bufo boreas

Feb. 15 Richmond - temp. of an adult ♂ on land 30 yards from NE end Pond A 12.8°C. air 13.4°C. Substrate 13.5°C. 9:30 p.m. Thermograph operating ± one degree C°.

Feb. 16 Returned 12:45 p.m. to check on ponds. Pond B which had high population last night now has no toads in water. However, Pond A at North end has 6 adults (probably more) in the water - 2 ♀, 4 ♂. I marked all adults I encountered this afternoon (total of 9) in or near both large ponds (see working data sheets)

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Bufo boreas

Feb. 16 Richmond, Contra Costa Co., Calif.

Pair found pond A in amplexus at about same spot I marked R-1 adult ♂ an hour ago. Time 1:49 P.M. Light mist began falling 1:45 P.M. Sky overcast and gray, air temp.
NE moderate breeze. The pair on bottom when discovered in 6" of clear water, 45 feet from N edge of pond. Reaction to my presence was to push downward into brownish pondweed and algae forming a 2-3 matting over the dirt bottom. Within 3 minutes the ♀ forced both to surface where she gulped air, and then they swam forward and downward to bottom 18" away. The swimming kick movements seem to be initiated by the ♀, but the male follows suit. At 1:58 they moved 6 feet westward parallel to pond edge, surfaced to breathe, and again moved forward and downward a few feet to the bottom. This repeated again until by 2:04 P.M. they had traveled 45 feet SW of original position. ♂ seems disturbed by my presence, though I am perfectly still 12 feet from him. He has turned to face my direction. Now both ♀ and ♂ have eyes above surface. Remained this position 6 minutes, then submerged and swam 12 feet (underwater) NE toward original position. Depth here varies 8-10 inches.

E. L. Karlstrom
1955

Bufo boreas

Feb. 16 Richmond, Contra Costa Co.
scattered grasses, cat-tails, and a tall (4') dry composite. Green grass (sedge?) growth to 20" with tips to 10" above water surface. Fair bloom of algae here, mostly covering surface of pond weeds procumbent along bottom. 2:17 P.M. Pair at surface now 10 feet due south of original position. Single adult also with head ½ exposed 16" SW from pair. Another small adult 2' W of pair. My movement caused one of single individuals to submerge. Grasses, small pieces of wood offer support to these toads. Now a second amplexing pair appears 5 feet from me and 4' N of pair I was observing. I now will mark some of these. First a test of how long they will stay submerged. Single ♂ adult 45 sec. once, then 1½ min. Expelled air from nostrils as it swam downward after being 20 secs. on surface.
Pair max. time 45 seconds but these are disturbed and active. Clasped male swims in unison female, ♀ has arms extended forward due to pressure of male clasp, but she does make some breast stroke arm movements.
2:35 P.M. water temp. 14.3°C. 2" below surface. Air temp. 12.5°C. above water surface. Depth at stake 11". Notch made with knife.

ELKarlstrom
1955

Bufo boreas

Feb. 17 Yosemite Valley, Mariposa Co., Calif. Brief visit here. Valley floor covered with from a few to 15 inches of snow, but patchy on talus slopes. Peaks snow-covered but no signs of very recent snowfall. ~~Sen~~ meadow S of Govt. Center where I had equipment has about 2-5 inches but bare areas. The grasses are matted down in brown tufts due to pressure of winter blanket. Black oaks bare but some dead leaves still clinging. Stoneman meadow heavier blanket of snow, 15" by actual measurement 30 feet SE of main road to Happy Isles. Small pond near lower end of Valley (El Capitan mdw, 3950 feet) where Hyla bred early last year, already has water standing at north ½. Rest snow-covered.

Ranger Elmer Hoyt gave me certain impressions of the winter in Yosemite. The snowpack and water content of snow in high country is higher by 8-10 inches than previous year, and thus close to annual mean based on 20 or more years. Valley got rain beginning Feb. 15 but nothing compared to 6" by this date in Feb. 1954. Prediction as to spring & summer run-off hard to make until after March snow survey. Meteorologists can predict available irrigation water within 3% after March survey, according to Hoyt. Hopefully, Yosemite Valley will have more water this summer than last.

E L Karlstrom
1955

Bufo boreas

Feb. 17 Hwy 140, 4 mi. NE of Planada, 500 feet, ~~Mariposa~~ Merced Co., Calif. Adult as toad crossing the road 8:30 P.M. Cloacal temp. 9.2° C., air 2" above dry pavement 10.8° C. Clearing skies, moderate westerly breeze. Only live toad seen during day. Road dry as we drove out of Yosemite area through foothills. Rains had fallen Feb. 16 on. Probably too early for general Bufo breeding migration.

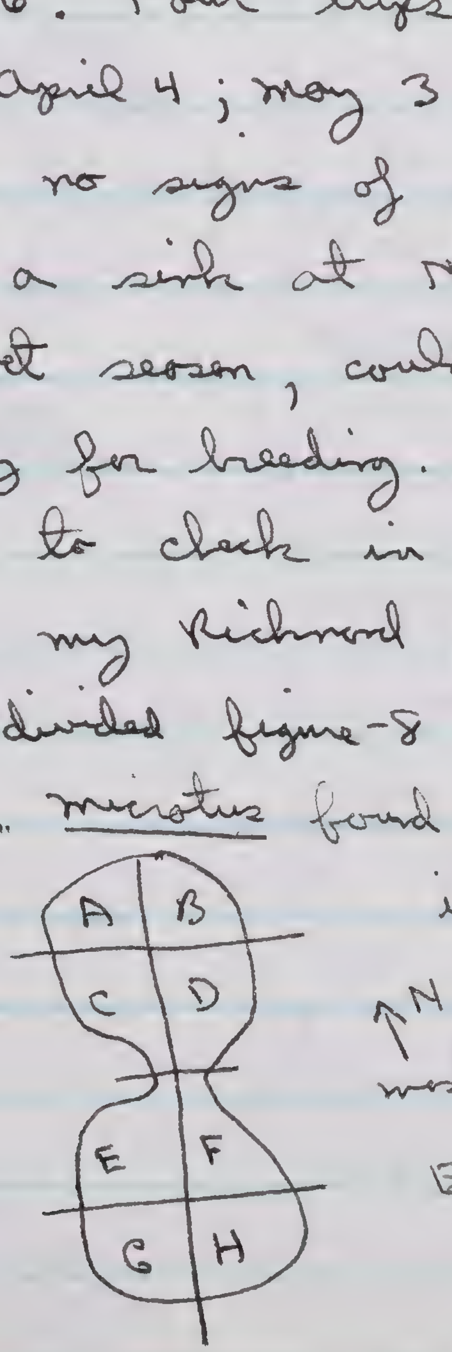
Hwy 140, 3 mi. NE Planada, Merced Co., Calif. D.O.R. adult badly smashed.

EL Karlstrom
1955

Bufo boreas

Feb. 21 Conversation with Vic Lewin concerning the fauna of an off-shore island near *China Camp*, *Marin Co., Calif.* Vic studied *Microtus* population spring 1953 for Vertebrate Reproduction course. Only other resident vertebrate noted was California toad, an estimated 5-6 adults with one slightly smaller than rest. Toads continually taken in Sherman live mouse traps, but several seen among grasses in the open. No surface litter. Toads using *Microtus* burrows of which there are a limited number. Total number of mice trapped 16. Four trips made to island: March 29, 30; April 4; May 3, 1953. No permanent water and no signs of young or larvae seen. There is a sink at NE end of island which, in a wet season, could conceivably offer an opportunity for breeding. Right now would be the time to check in lieu of great volume of water in my Richmond ponds.

Lewin divided figure-8 island into 2 sets of quadrants. *Microtus* found only on SW half of



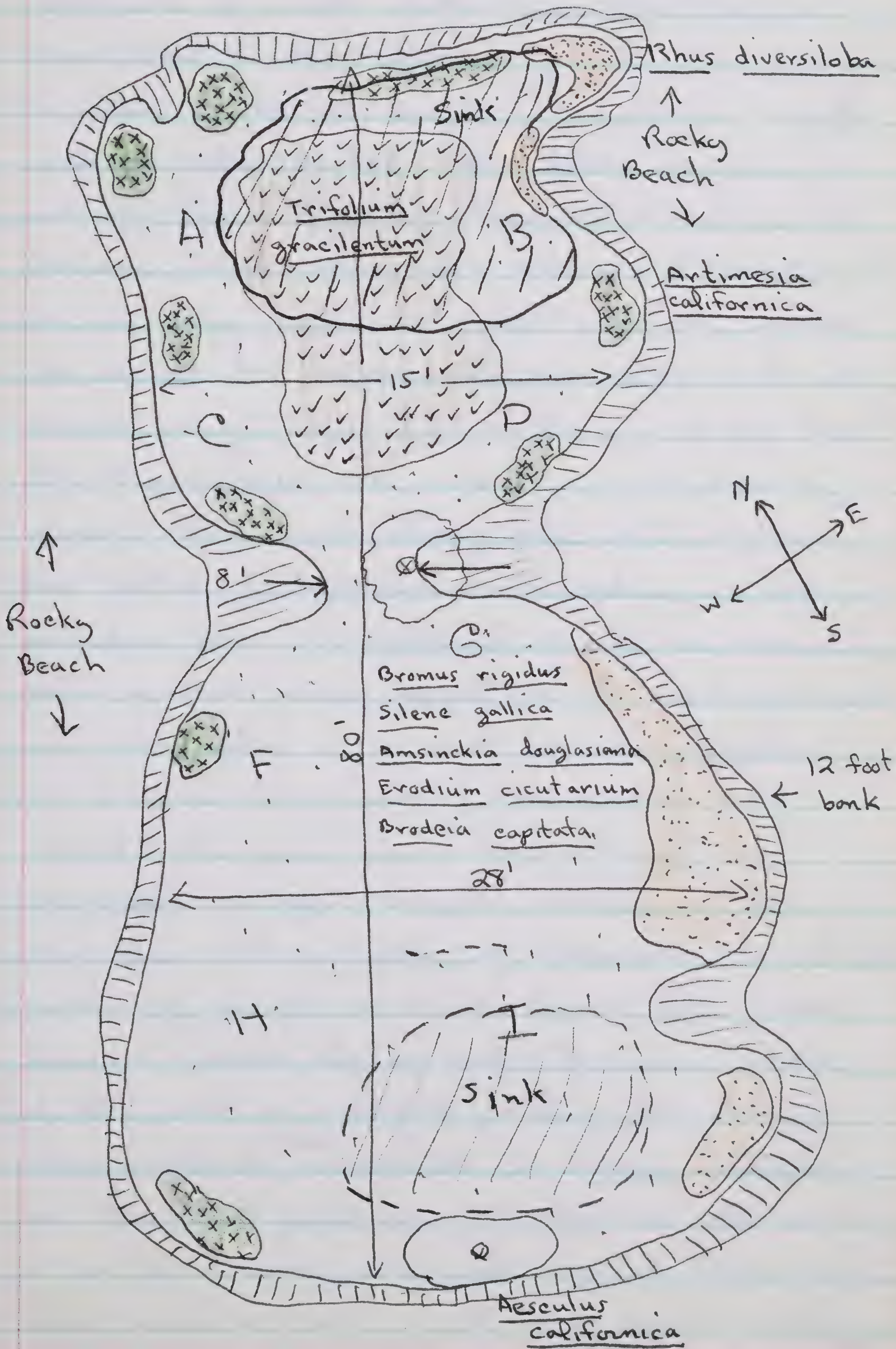
island. Toads found both sections, but most recorded from trapping EFGH section.

E L Karlstrom
1955

Bufo boreas

"Rat Island"

Feb. 21 "China Camp island", Marin Co., Calif. as drawn from Vic Lewis's field report spring 1953.



E L Karlstrom
1955

Bufo boreas

Feb. 22 "Rat Island", 4 miles W of San Rafael, Marin Co., Calif. (small island offshore NE China Camp). Borrowed a small skiff from China Camp and rowed out to the island 9:10 A.M. Clearing skies, sunshine, light NE breeze. Vic showed me microtus burrows where he had taken toads quadrants F and G. Sherman traps had been set at entrance to burrows. Toads taken were released at same spot, and Vic says most went right into the burrows. He checked his traps about 9-10 A.M. but can't recall seeing toads out in the open at this time. Air temp. 9:46 A.M. 12.9° C. 2" above dry grasses. There is no standing fresh water whatsoever and bottom of depression both sections is only wet from dew. The quadrants H & I are covered with a shell mound deposit 20-30" depth. Charcoal and ashes found in a small depression quadrant I. Sink is 8'×10', sloping and 14" deep. Now covered with green grass shoots 3" high, dry amsinckia, a dry composite. Russell and Lewin dug down 4" in bottom of depression. Unmistakable evidence of fire pit since old charcoal and charred bones 2" below the top sod. The porous nature of this soil is additional evidence that breeding sites would not likely be available to boreas. Centipede and sow bug found near the depression area down 3" in burnt area. At west edge of bank we found numerous bones in the shell deposit - mostly

EL Karlstrom
1955

Bufo boreas

Feb. 22 "Rat Island", 4 mi. W San Rafael, Marin Co., Calif.
fragments of avian bones, possibly some small mammals (a number collected). Lewin kept digging in middle of depression, charred fire pit down to inches. Definite fire strata noted. Another shell mound at extreme opposite end AB quadrants. Another depression 12' x 8' x 16" maximum depth. not a fire pit like other depression but same porous shell deposit. Vic pointed out an interesting rodent burrow at SE edge of this depression. Pile of cuttings noted 1953 in front of hole. It cuts into 60° sloping bank. Opening 5" wide 4" high at mouth. Slopes inward and downward 20°, goes in about 8-10" and then forks Y-fashion. Opening partially occluded by grasses, and dirt heaped out talus fashion at base which slopes down to bottom of sink. Lewin set traps 1953 in front of it but never got any mammals or toads. No microtus taken this half of island. Duck hunters have dug a 4' x 8' x 3' pit for a blind in quadrant A. No signs of insect or other life at bottom of pit. Phenotypic picture this: 2 buck-eyes leafing out, leaves to 2" length. new buds opening on poison oak but not burst. Amsinckia to 6" height, other grasses to 4-5". Vertebrates observed were Hermit thrush, 2 song sparrows, one ♀? junco. The thrush shows extreme territoriality as four of us got within 5-6 feet of it. Of course,

E L Karlstrom
1955

Bufo boreas

Feb. 22 "Rat Island", 4 mi. W San Rafael, Marin Co., Calif.
the confining nature of the small island, lack of adequate bush cover, contributes to its reluctance to flee from a bush. Song sparrows also very reluctant to leave bush cover at quadrant G. If flushed, they moved usually to poison oak at B, but returned.

The point on the mainland due SE of island. Estimated 90 yards. Almost vertical 12-16' cliffs around the point but a shallow beach in 150 yard deep cove to NW of the jutting point. 10:30 A.M. current running SW along the SE tip of island 10 feet in 18 seconds. Levin claims a swift tidal current operates here. Island walls near vertical sandstone and topsoil above, except for two places A + I where slope 40°, rough eroded sandstone. Higher angle (60° ±) near upper 3-4 feet of these slopes. It is quite conceivable that toads could swim or be carried by current to this island and finally work their way up to the top, but circumstances would have to be just right. That the toads are breeding on this pile of dirt and rock is hard to believe — unless the rodent burrows might retain rain water.?

The problems faced by this "population" are intriguing. A few nights spent on the island would be worthwhile. Levin suggests use of Sherman mammal traps.

EL Karlstrom
1955

Bufo boreas

Feb. 22 Vicinity of Tub Lake, 1½ mi. W of San Quentin State Penitentiary, Marin Co., Calif. Artificial lake nestled in hills behind a sewage disposal plant. Small adult ♀♀ under piece of galvanized iron 3'x2' x 1/16" thick. Cloacal temp. 26.7° C. 12:20 P.M. Air temp. (bulb shaded) 2" above dry ground 15.5° C. microhabitat heated up and soil only slightly damp under piece of tin. Full sun, clear sky but moderate coolish breeze. Soil temp 19.8° C. with bulb just immersed in soft soil where toad sat. Dick Russell and Jim Anderson found another toad, a juvenile, under flat board 25 yards away. Tub Lake lies 200 yards NE of this point, a possible toad breeding site. However, a close scrutiny of pond edge all around showed nothing but a few young bullfrogs and many Gambusia affinis.

1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif. 1:45 P.M. Chest containing soil thermograph and one max-min. thermometer has been stolen! Searched area within few hundred yards of pond A but no sign of the apparatus. Suspect older kids or an adult - probably too heavy for young kids. Damn it! Toads have laid eggs probably within last 24 hours in vicinity of the weather station. Excellent data out the window!! Anyone for a lab problem?

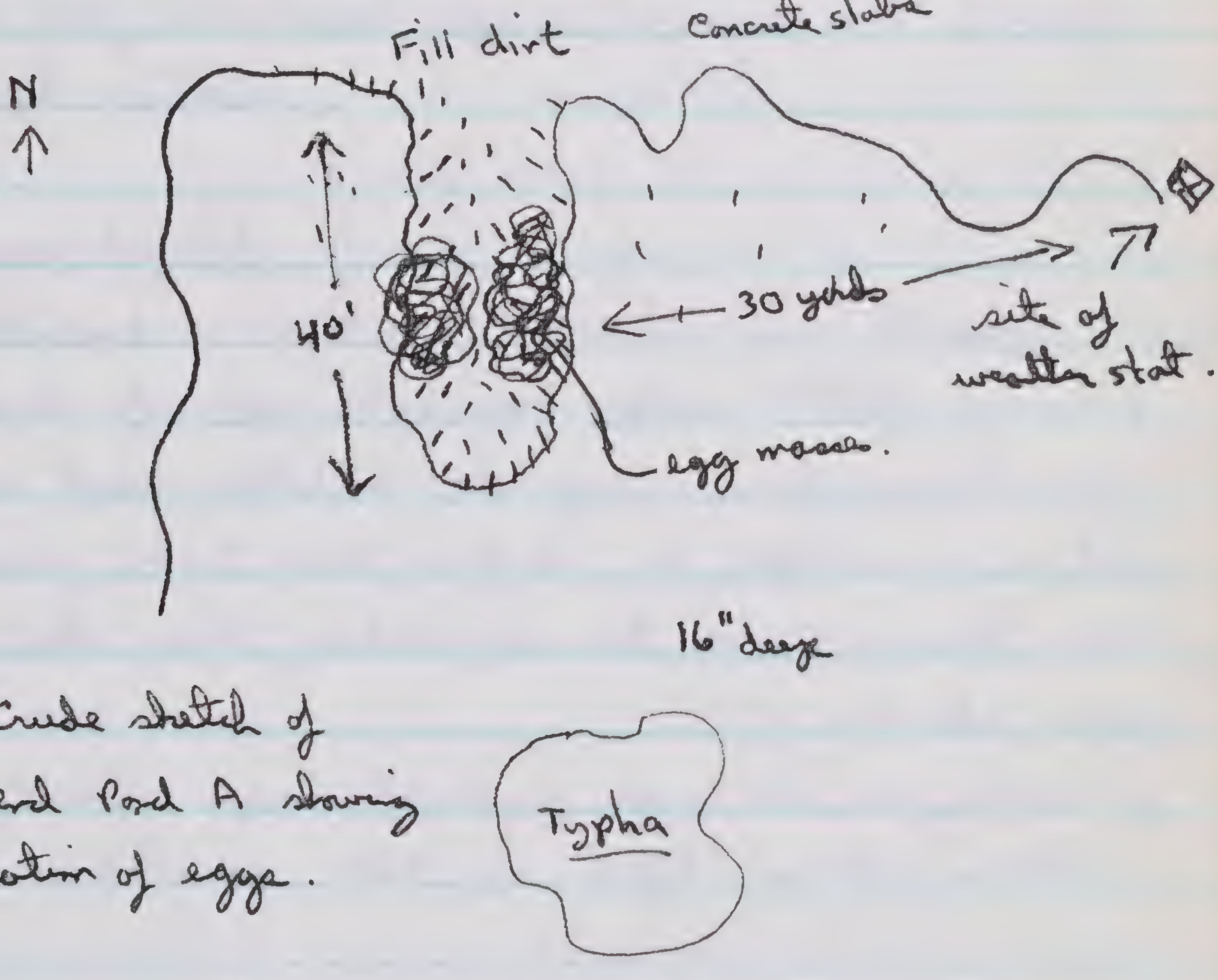
E L Karlstrom
1955

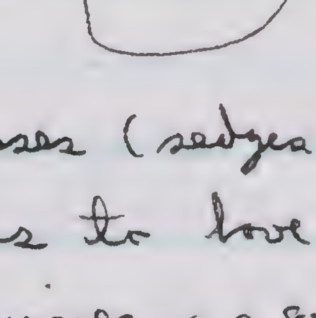
Bufo boreas

Stages # 10-11
Pollister & Moore (1937)

Feb. 22 Richmond, Contra Costa Co., Calif.

One batch of freshly laid eggs (~~early~~ late cleavage) over an area 4'x6' in grassy area 20 feet south of the extreme N end pond A. Another 5'x5' batch (different female?) at approximately same developmental stage lies just W of first group.





Crude sketch of N end Pond A showing location of eggs.

A peninsula of grasses (sedges?) growing up out of the water appears to have been a favored deposition site. The grasses are 8-16" tall, green, to 10" above water surface. Water depth 6-8" where eggs laid but the strings are mostly less than 3-4" below surface due to entanglement in the grasses lying at all angles here. Strings single or double, elongate, criss-crossing each other suggesting an actively moving female.

E L Karlstrom
1955

Bufo boreas

Feb. 22 Richmond, Contra Costa Co, Calif.

Another batch of eggs found in Pond B about 20 feet from extreme SW corner. Over area 4'x5', water depth 3-4". Grasses present here, although area is open pasture-like area. Eggs appear unfertilized, are attacked by fungus and bacteria, the jelly envelopes appear opaque and fuzzy. Sample collected.

Feb. 23 Same locality

Returned 1:45 P.M. to make more thorough search of area. Richmond police (theft division) have been notified and given a description of missing chest and contents. I left a description of both with watch-man at small plant north of pond A (   ) and the manager of Trailer court bordering pond B. My searching and questioning shed no light on the matter.

Pond A level lower by ½" on stake. Hyla to maximum length of about 3/4" but not abundant yet. Air temp. 16.5°C. at 3:15 P.M. Pond 16.2°C. A third batch of recently laid Bufo eggs located among grasses 35' SW of former weather station. Eggs over area 4x8', water depth 4-6", sparse grasses growing up through water. Eggs not lower than 4-5" in water depth. About 5-10% appear "bad"

E.L. Karlstrom
1955

Bufo boreas

Feb. 23 Richmond, Contra Costa Co., Calif.

with swollen, opaque jelly coats. Estimated 60% of strings are double strands, rest single. One 2'x2' area especially dense with egg strings. Criss-crossed, up to 8 strands deep at one point. I traced out one continuous double (and single some points) strand with my hand. It had a total unbroken length of over 12 feet. Sharp angles around grass stems suggested that ♀♀ exerted considerable tension on strings as she crossed and re-crossed the strands.

Water temp. here where pond 4" deep, taken 1" below surface 4:00 P.M. 16.8°C.

Pond B at SE end where eggs observed yesterday. Pond temp. 1" below surface 17.0°C. at 4:10 P.M. Water depth 6" here. Many decomposing eggs near to surface.

Feb. 24 Same locality. Night check here during cold rainstorm. Rained hard Bay Area nearly all day. As I approached the N. Richmond site the rain was literally "coming down in sheets". It eased up to a drizzle about 7:45 P.M. but driving hard SW wind continued. Thorough check of three ponds in area. No toads seen in the water, temp. 1" below surface 9.1°C. 8:05 P.M. 4 adults taken in grasses, on path all within 20 feet of ponds. Cloacal temps. were

E.L.Karlstrom
1955

Bufo boreas

Feb. 26 Richmond, Contra Costa Co., Calif.
7.8° at 7:48 P.M., toad on dirt path 30 yards S of Sanford St. on E side Santa Fe raised tracks. Air temp. 2" above wet ground 7.5° C. Another, a ♂, collected 10 feet west of middle portion (west side) of pond B on 20° grassy slope, headed away from pond. Cloacal and air temps. same as above. Two other adults later (9:00 P.M.) taken near where first captured. One had cloacal 7.3°C., air temp. 8.1° C. No adults found in or vicinity of pond A nor in area at S end of Pond B where over 25 were censused Feb. 15.

~~Feb. 2~~

March 2 Same locality. Night check 8-9:30 P.M. with Harry Wessenberg. Developing larvae at egg site #1 (see map Pond A) are now stage 17+ (Pollister & Moore 1937), but the loss of embryos seems to be close to approximately 40% at this time. Those normally developing embryos are attached to outer jelly envelope. Defunct eggs + embryos (many may have not been fertilized) remain, as would be expected, within the two jelly capsules. All strings appear opaque, whitish and fuzzy even where normal larvae are adherent.
This locality harbors a very large breeding population of toads. Weather tonight clear, cool but little breeze. Moon half phase. Air temps.

E L Karlstrom
1955

Bufo boreas

March 2 1.3 mi. N, 0.2 mi. W of Civic Center Richmond, Contra Costa Co., Calif. — 8-9° C.

Total count of adult toads (probably too low) Pond B on east side Santa Fe tracks:

39 ♂, 3 ♀ (2 amplexing pairs)

Pond A west of Santa Fe tracks:

15 ♂, 3 ♀ (3 amplexing pairs)

Total of 54 ♂'s, 6 ♀ both ponds or 60 toads. Storer (1925) states that ordinarily a breeding population of no more than 12-15 pairs will occupy one local area. If there are as many females as males in this area, an estimate of a hundred adults is not stretching the number a bit.

Temperature data follows:

8:00 P.M. Pair in amplexus Pond B at N end about 50 yards south of trestle. Cloacal both 12.0° C. Water temp. same. Air temp 10.5° C. over water. Water depth 3 inches here.

8:31 P.M. pair in amplexus crawling out over area of low grass and bare ground. 6 feet SW of wedge pond B near middle portion of it. Cloacal 8.0° of ♂. Air temp 2" above substrate the same. Ground surface 7.8° C. ♀ active, carried ♂ to water after I handled them.

I watched an adult male's response to my presence. He swam to bottom, remaining there for 6 min, 13 secs. as I observed it with my headlamp. Then surfaced for ~~gulps~~ intake of air thru nostrils,

E L Karlstrom
1955

Bufo boreas

March 2 ~~Fri~~

Richmond locality – and immediately swam again to the bottom which here was 14" below surface. I heard but one male call tonight, a series of half a dozen notes given when Tony and I first approached the pond. The males are not restricted to edges or shallow water. Many were seen out in deepest parts of pond (over 3 feet deep some areas) but usually resting against some grass ~~–~~ or other debris. Two positions of males noted. One, they are spread-eagle and nearly parallel with surface, their backs strongly depressed Others seen resting in a near vertical position, rear end down along with at least one hind leg, as forelimbs laid against grass or other debris.

March 7 Same locality.

Night check here with Dick Russell who was my chief recorder of marked toad data. We marked about 31 adults (16R to 45R) in ponds A and B. Total census:

Pond A : 25 ♂, 2 ♀
Pond B : 18 ♂, 3 ♀ (one collected)
43 ♂, 5 ♀ but this figure

probably much too low. Full moon, clear skies 7:30 – 9:15 P.M. tonight. Air temp. probably 16 – 17° C., water the same (no thermometer along). The ♀ I collected was on Sanford block - tags

E L Karlstrom
1955

Bufo boreas

March 7 1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif. road, facing pond C north of road, and probably on way to pond for evening. Toad breeding condition. At 7:30 P.M. the males seemed to be in the ponds, for none observed on land. Difference in behavior of toads tonight. They were harder to catch as they usually dived for deeper water. The full moon plus warmer temperatures may be responsible. Many toads would be spotted with my head-lamp but quickly disappear or swim off as I was busy marking one individual. Russell and I circumscribed Pond A twice, marking all toads I could grasp. Of 15 toads (or so) clipped the first round, only one was retrieved the second round and 8-10 new toads were discovered and clipped. Hence, any population count based on number of toads in hand can probably be doubled. As marking data shows, the adults cluster around vegetation in the ponds but many are out in deeper water (3-4 feet) and often in open water.

Larvae at egg site #1, Pond A, have reached stage #20 (Pollister & Moore) but appear attached to edges of the outer jelly envelopes. Envelopes are opaque, algae covered. Mortality of eggs (based on examination of 2 feet of strings) is probably in excess of 50% at this time. However, this is ~~not a close~~ done at night.

ElKarlstrom
1955

Bufo boreas

March 12 1.3 mi. N, 0.2 mi. W of Civic Center, Richmond
Contra Costa Co., Calif. - The tadpoles in vicinity
of egg site #1, pond A are hatched out and
free of the jelly which is decomposing and algae
covered. Recovered 5R ♂ (see marking record)
which had apparently been killed by kids
with BB gun. Recovered at NW end of Pond A
about 30 yards NW of site where marked Feb. 16th.
Another adult ♂ also found dead - but not marked.
A few adult *Hyla* also had been killed same
pond. Otherwise, no adult toads collected this
morning 11 A.M. to 12:30 P.M., although two
boys of junior high age reported seeing a couple
in Pond B. Day warm and fair, breeze moderate.
Dry conditions. Pond level down ½" from last
visit March 7th.

Eggs (most fertile) collected Pond B 40 yards
from SE end and 15 yards from the fence on
the E side of pond. Early gastrula stage. Strings
wound among grasses 4-6' from pond edge in
water 8-10" deep, but eggs no more than 4"
below water surface. Patch of egg strings 3x4 feet.

Larvae ~~Eggs~~ also found in shallow muddy puddle along
footpath NW part of Pond B, pole position 2⅛ S.
Near hatching, swimming stage but some of the
eggs had been dragged over wet mud and
were addled. Eggs had been spread over 10 x 2½'
area with heavy concentration in middle of patch.

ElKarlatham
1955

Bufo boreas

March 12 — Richmond locality - another batch discovered at pole position 1.8 - these just hatched out. Water depth here not exceeding 2". Water temp. 16.9° C. at 12:10 P.M. Air temp. 14.8°C. 2" over water.

March 23 — Same locality. Night check here with Harry Weisenberg between 8-9:15 P.M. Mild night, clear sky, with no trace of breeze. Water temp. Pond B 12.8°C. at 8:14 P.M. 1" below surface where depth 6". Air temp. 14.9°C. 2" above water surface. Tadpoles at SE corner pond B (reported March 12) recently hatched out and swimming. Restricted to area where eggs had been observed.

The muddy area at NW end of pond B now lacks standing water, although soil is still wet. It is dotted with dead and decomposing or dried (in places) tads. One group is just beyond neurula stage, the other hatched-out larvae. Pond B level noticeably down, probably 2-3 inches, with cans, tires, other rubbish beginning to be more prominent. Water is less clear than before.

Tads at egg site #1, Pond A have ranged out but none were found farther than about 15 feet from site of egg deposition. Body length 7-8 mm, tail 9 mm. Some recently hatched

ELKarlstrom
1955

Bufo boreas

March 23 — 1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif — tads also picked up indicating another egg group laid more recently. *Hyla* outnumber *Bufo* tads 10:1 this area. Ostracods, crane-fly larvae very abundant (sample preserved). *Bufo* tads observed rasping on dead crane-fly larvae in jar.

Fewer adult toads out tonight. Census of toads seen or caught:

Pond A:	3 ♂	1 ♀	
" B	12 ♂	0? ♀	
" C	5 ♂	1 ♀	(in amplexus)
	20 ♂	2 ♀	

One pair seen in amplexus but I was unable to get them. No toads found out of water, although grassy areas damp and evening mild. Adults difficult to catch, would submerge into murky algae-covered vegetation when disturbed by my head-lamp or rippled water surface. Recovery of two marked ♂'s (see data sheets). One ♂ had shifted across road, under trestle to Pond C from A, possibly few hundred yards. An adult ♀ was collected from middle of Pond A for breeding purposes. Inflated lungs, floating open water. A male 10 yards away.

E.L. Karlstrom
1955

Bufo boreas

March 23 — 11:15 P.M. Interesting behavior of adult toads noted. Placed adult ♂ and ♀ collected this evening in large aquarium with 5-6" water. After a half hour the ♂ began amplexus with ♀. The ♀ responded by attempting to climb up glass wall of aquarium. ♂ vigorously forced her head down by pushing his chin forcefully down between her eyes and arching his back at the same time. Agitated "clucking" accompanied his attempts to pin her down. His hind legs were used alternately to force her forelimbs off the glass. The result when followed by swimming leg movements by the ♂ was to force the pair to the bottom of the aquarium where they would remain quiet a few minutes. The act was repeated 3-4 times in 5 minutes. After ½ hour of amplexus the pair separated but remained motionless near each other. The above behavior has not been seen in the field, but it well could be the normal pattern of the ♂ subduing the ♀ when they first pair up. (?)

March 24 — Above pair in amplexus 8:10 A.M. today. Pair is quiet, resting on edge of submerged rock in aquarium. Heads only above the water.

E. L. Karlstrom
1955

Bufo boreas

April 6 Richmond locality. night check here. Water temp 16.2° C. 1" below surface pond A at 9:00 P.M. Air 12.5° C. Cloacal temp. of adult on bank 16 feet from edge pond A 9.1° C. Substrate the same. Air 1" above 9.8° C.

E L Karlstrom
1955

Bufo boreas

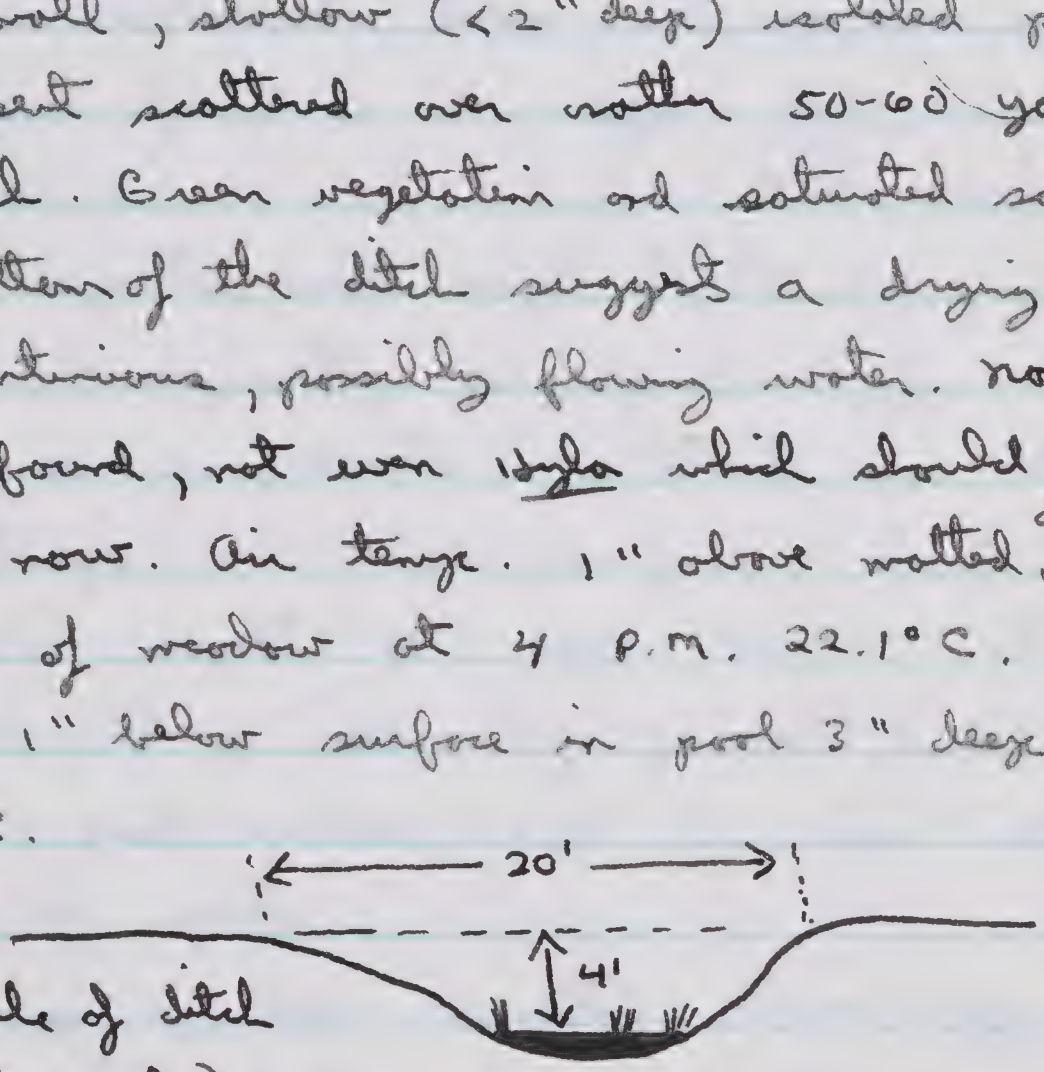
April 12 — Stoneman mdw., 4000 ft., Yosemite Valley, Calif.

Arrived here 3:15 P.M. The entire Valley is considerably drier than it was at the same time last year. The falls are full, patches of snow cover the higher rocks and peaks and extend down the draws but the amount of snow is ½ of what it was one year ago. Here in Stoneman meadow the absence of water was surprising. There is no snow on the valley floor at all, even up here at the cooler SE end. There are patches at the base of the N-facing slopes down to Camp Curry in the denser forest. Ponds A and B, all the ditches on the south side are devoid of standing water. The soil at the bottom of the depressions is moist, but no water can be forced from it when it's pressed between the fingers. The annual meadow grasses and sedges are brown, dry and matted down. Fresh green growth is sparse but the blades extend to 4-5 inches above the matted grass surface. The western azalea has closed buds. The black oaks have the tiniest buds on the bare twigs. Steller jays, red-winged blackbirds are active in the meadow margins. Flocks of robins were working the bottoms of the ditches on the north side of the road, probably for worms and insects in the moist soil. Some standing water is present along the base of the ditch on the north side of the

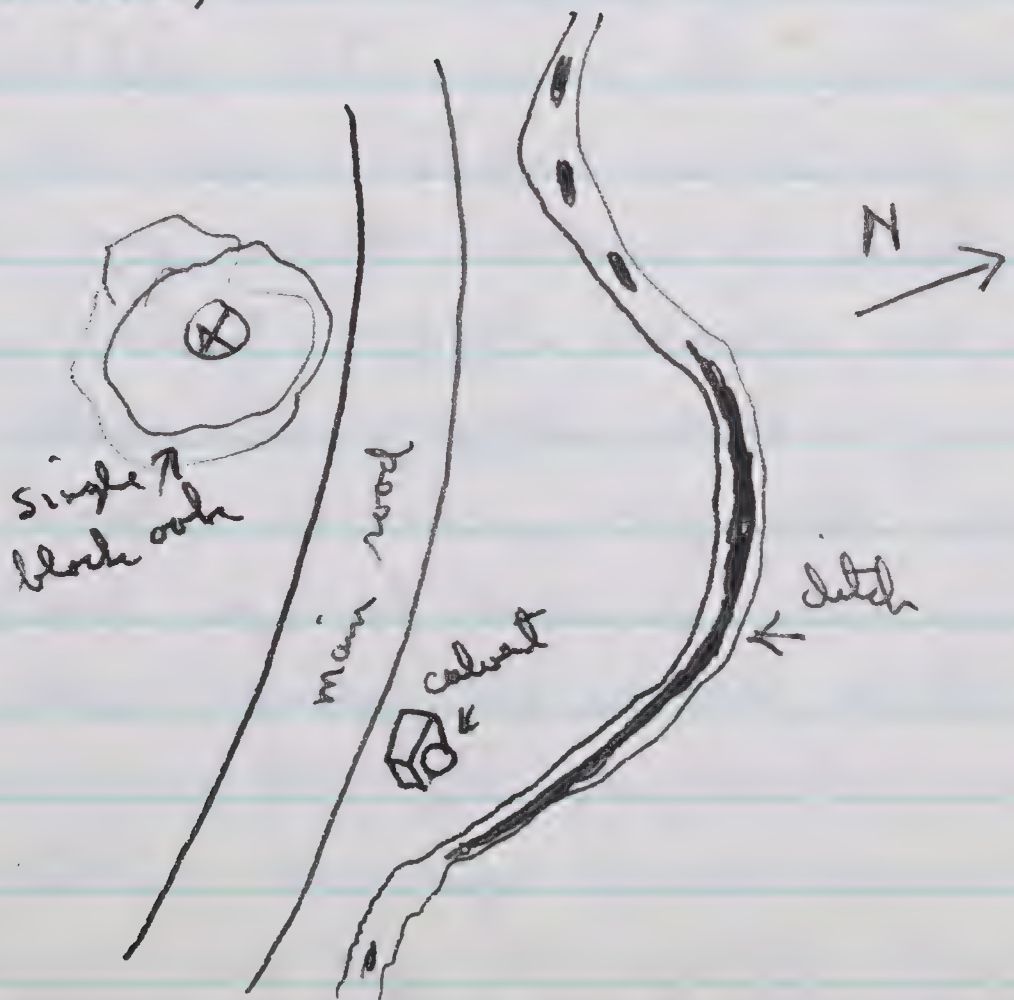
-Karlstrom
1955

Bufo boreas

April 12 road bisecting Stoneman Meadow. The longest pool of continuous water occurs along 40 yards of the ditch. Maximum width of pool is 4 feet, max. depth 4-5 inches to false bottom of matted vegetation. Some small, shallow (< 2" deep) isolated puddles are present scattered over another 50-60 yards of the ditch. Green vegetation and saturated soil at the bottom of the ditch suggests a drying up of once continuous, possibly flowing water. No anuran eggs found, not even *Hyla* which should be breeding now. Air temp. 1" above matted dry grass surface of meadow at 4 p.m. 22.1° C. Water temp. 1" below surface in pool 3" deep was 18.9° C.



Profile of ditch
(not to scale)



E L Karlstrom
1955

Bufo boreas

April 12 Night check of several Yosemite Valley toad localities. 7:50 P.M. ½ mile SW of Gov't. Center. Discovered an area of sinks at the lower end of a long broad meadow. One pond (describe later) is extensive, deep, and appears permanent. No signs of toads or eggs. Hyla regilla, very numerous and active. Garter snake (Thamn. elegans) spotted with night light lying in the water and apparently preying on Hyla. This, of course, is a predator on toads as well. Pond temp. 1" below surface 1 foot from edge where depth 4" was 14.8°C. at 7:50 P.M. Air temp. 1" over dry grass 7.3°C. and 1" above pond surface 8.0° C. Some "steam" rising off water.

Stoneman Meadow revisited. Two Hyla observed in the ditch but no signs of toads around only available water or on the pathways, roads crossing the meadow. Earlier in the day I observed many ~~recent~~ evidences of recent rodent activity — casts of Microtus burrows once under the snow, ~~[illegible]~~ other Microtus runs in grass, gopher mounds & burrows, many mole mounds, some ground squirrel burrows under pines and black oaks bordering the meadow on the SE. The same was true for the meadow south of Gov't. Center. The large ground squirrel burrows at Stoneman run deep and probably afford good

E L Karlstrom
1955

Bufo boreas

April 13 Toad niches.

1/4 mile SW of Govt. Center, 4000 ft., Yosemite Valley, Calif (Mariposa Co.) 11 A.M. Set up weather station at edge of pond in large meadow here. It involved a shift of station 200 yards W of site set up last year.

Photographs taken 11:30 A.M.
4x5 Voigtlander camera.
Plus-X film pack #1 taken facing E toward Half Dome from 20 feet south of the study pond. F 20 at 1/100th.
Plus X 4x5 #2 facing NE to right of Yosemite Falls. Taken from SW end of the pond F14 at 1/100th.

Kodachrome 35 mm. (36 exposure)
#1 taken just inside Park entrance on Hwy 140 of a redbud *Cercis occidentalis* in bloom.
#2 taken of Valley weather station while standing in the pond, Half Dome in distance.
#3 facing NE from point 2/3 the distance from NE end of the pond.
#4 Clark (?) Range from Glacier Point road west of Peregoy Meadow.

~~Set up~~ A detailed description of pond where station set up will be ~~made~~ next trip. Depth at yardstick marker now 10 inches. The pond appears to be over 21 inches deep

ELKarlstrom
1955

Bufo boreas.

April 13 in the middle. Presence of pond lillies gives this particular pond the appearance of permanency. Hyla were chorusing here last night but a quick look in the pond revealed no egg clusters. Water is clear, bottom silty and soft. No flow through a culvert at the SW end of the pond. Practically no insect life except for few water-striders, and no bloom of algae yet. Water temp. 1" below surface 1 foot from pond edge at 4:00 P.M. 19° C. Pond (Tag) thermograph set accordingly. Air temp above grass same time was 16.8° C.

Mariposa, 1900 feet, Mariposa Co., Calif. 6:35 P.M. One very large adult D.O.R. on blacktop road west of Hwy 140 through town. This road parallels slow-moving creek. Many quite still pools present along wide creek bottom. Algal bloom high, so much air is putrid with its odor. Adult ♂♂ heard calling 6:45 P.M. but I couldn't find it. An adult ♂♂ collected among vegetation in stream 6:55 P.M. Cloacal and water temp. ~~12.8~~ 12.8° C. (12.0° C.) In middle of channel the colder water moves about 1 yard in 2-3 seconds. Heavy weed growth, some scattered clumps of cattails. I worked along this algae-choked stream until 8:30 P.M. Adult ♂♂ toads (about 5) were taken on or near the black-top road paralleling

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Bufo boreas

April 13 Mariposa Creek, Mariposa, 1900 feet, Mariposa Co., Calif. — the west side of this tributary to Mariposa Creek. The stretch of stream is located one block west of the center of town (Bank of America, etc.) more detailed description later. I collected about 25 adult ♂ toads, 1 gravid female (not in amplexus) Toward the SE end of the stretch I worked (near bridge) the cattails were thicker and some pools deeper. Many adult bullfrogs sighted here but no toads. 4 adults were collected by hand.

A sample of Bufo tadpoles taken from near upper end of portion of stream. ~~toad~~ Tadpoles so thick they appeared as a dense black patch over rocky bottom at margin of stream. Algae plentiful right here, and tads actively foraging. Water eddied slightly over rocky substrate but moved very slowly where tads present. Groups of tads spread over area 4 x 10 feet but concentrated in two smaller (2x3') patches. Water temp. in midst of group 13.0°C. at 7:20 P.M.. Air 11.8°C. This spawn could be result of a couple matings. No pairs found tonight in amplexus, although abundance of males indicates that breeding is at possible peak.

April 14 Toads and bullfrogs survived trip. Note coloration pattern of one adult ♂ which lacks vertebral stripe, is greenish like a B. canorus male.. (see color notes)

L Karlstrom
1955

Bufo boreas

April 26 Mariposa Creek, SW side of Mariposa, 1900 ft., Mariposa Co., Calif. 12:05 P.M. Took some habitat shots here with Voigtlander 4x5 camera.

Plus-X #3 F12 at 1/100th. Facing south. Part of stream where toad ~~eggs~~ tads found April 13.

#4 close-ups of tads at edge of the creek. Gravel and rock bottom with scattered patches of silt. F 5.6 at 1/100th. Sample of tads taken.

Air temp. 2" above damp grasses at 12:30 P.M. 10.4°C. Water at edge where tads lay 12.6°C. In deeper water (6") where more tads 11.2°C. In middle of stream where water flowing one yard in 2-3 seconds and 14" deep 10.8°C. Intermittent rain and sunshine at this time. Snow lies at N base of houses. First seen SW of Mariposa along road at 1500 feet. Hail and/or rain intermittent between Cathay and Mariposa. The stream here has a maximum width at present of 50-60 feet but stream bed is twice as broad. Maximum depth of water to 14", moves fairly swift (few feet per second) in middle. Pools of eddying water at edges or formed by tributary flow. Vegetation breaks up the stream bottom - scattered cat tails, mint, a dock (Rumex) and mostly an unidentified succulent growth forming mats 20-30 feet across and to 20" above water surface. Alder and willow line the stream, densely on NE side, low scattered willow clumps SW side. Algae in heavy bloom where water moves slowly. The stream bottom

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1955

Bufo boreas

April 26 is boulder-stream, a mixture of gravelly soil and rock but rock constitutes fully 80-90% of surface. Red-winged blackbirds singing in area. No adult toads heard or seen at this time. The tads observed hugged SW edge, congregating in greatest numbers right at the edge where water ½" deep or less. Temp. here to 15.8°C. at 12:35 P.M. Those present out from edge tend to face up current (where current at surface runs one yard in 6-7 seconds). So far I haven't observed tadpoles or eggs elsewhere along the 200 yards of stream quickly surveyed.

Although silty bottom areas are present, this stream is still a rocky-type foothill creek. Toads were seen April 13th in all parts of the stream - deep and shallow water - although not active in the faster flowing middle channels.

Toad cover in area is extensive. SW of the stream are some fenced fields, a small machinery yard strewn with equipment and junk, houses, etc. The NE side has heavy brush and riparian tangle plus open field areas and houses behind.

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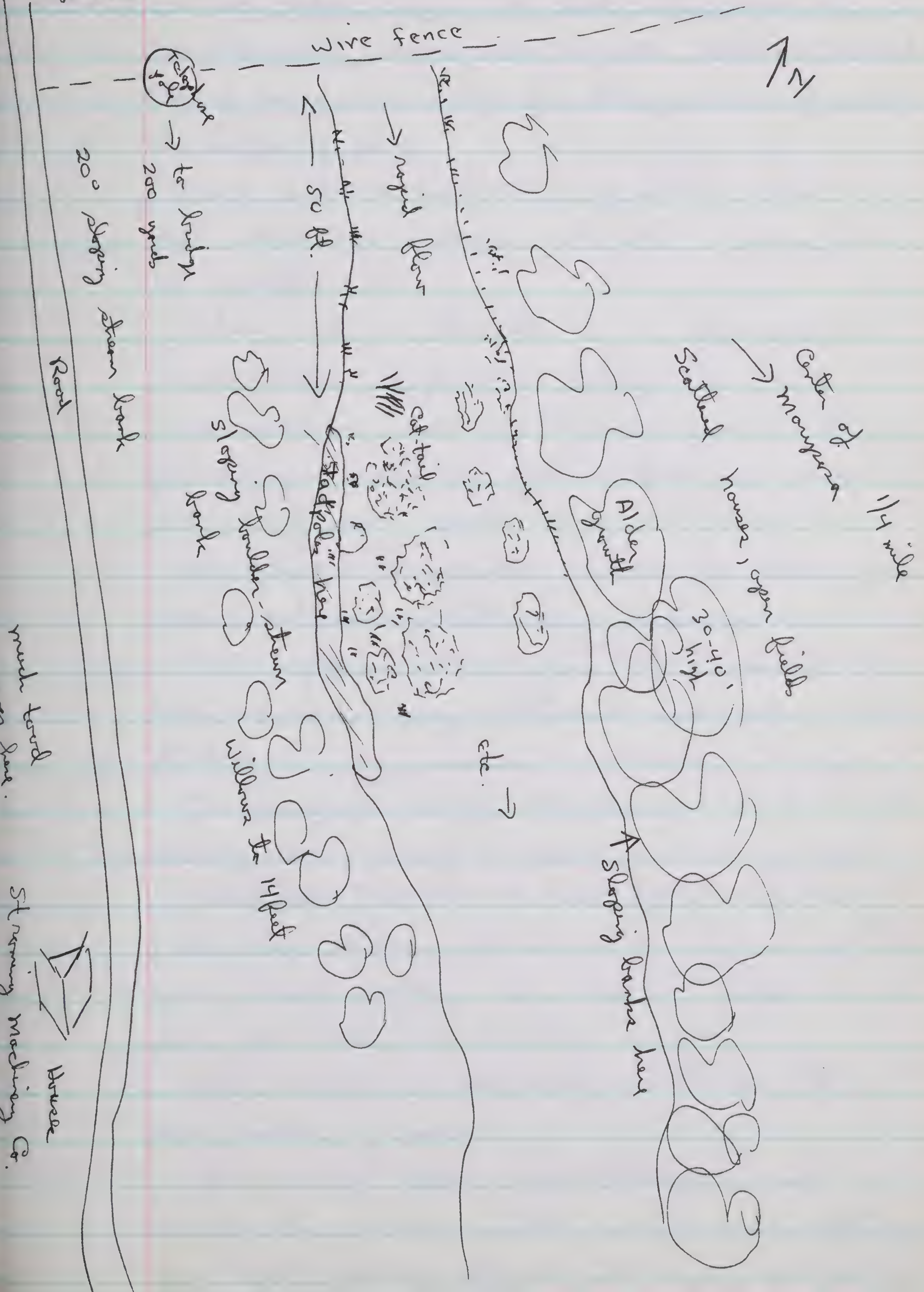
Bufo boreas

SW side of Mariposa, Mariposa Co., Calif.

April 26



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Bufo boreas

April 27 Sentinel mdw., 1/4 mi. SW Gov't. Center, 4000 ft., Yosemite Valley. 11:20 A.M. Weather station flooded. Top of heavy lid covering the thermographs barely shows at surface of pond.

Doug Hubbard made check of station April 20, 1955. Max-min. readings 74°-20° F. Water level on yardstick 15".

Today max-min thermometer is 4" submerged but vapor bulbs out of water. Reading 68-23° F. I moved max-min. box up to higher ground but partially surrounded by grass hillocks now covered with 3" of snow. Depth reading 27 3/4" on stick.

The flooded thermographs removed for oiling and repair. Tub & cover left up on high ground.

4X5 Voigtlander Plus-X film (#5). Almost identical shot taken April 13, facing NE toward Gov't. Center. 1/200th at F16.

#6 facing E xNE toward Half Dome. F22 at 1/200th. showing the S end of the pond.

Kodachrome #6 F14 at 1/50th facing NE toward Indian Canyon

Air temp. 10.7° C. at 12:15 P.M. 1" above wet bare grass (bulb shaded). Water temp. 1" below surface where pond depth 14" 11.2° C.

Made several 6' pond sweeps with dip net along bottom of pond.

The snow of Monday night followed a rain according to a local resident, and it snowed yesterday. Snow depth yesterday afternoon was 8-10 inches in

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1955

Bufo boreas

April 27 Sentinel meadow and was all but continuous except for ponds and small pools. It froze last night even inside my car but today the melt-off has been rapid. By 1 PM most of the snow is off the trees in the middle of the Valley. Sentinel meadow has snow depth 6-8". About 30% of Sentinel meadow open area is exposed clumps of grass or water. Cottonwoods along Merced River have new leaves just opened up. Black oaks budding but no exposed leaves. Kingfisher (1), Calif. woodpeckers, robins, redwings, mt. chickadee, Steller's Jay active in meadow. Robins foraging on worms stranded along black-top pathways and over bare soil. Violet-green and rough-winged swallows (couple pairs?) and Audubon warbler also observed.

Stoneman Meadow, 4000 ft. 1:30 P.M. Snow melt slower here. Pack to 12-14" some spots. Only meadow margins and runoff stream and pools (N side of road) are bare of snow. Water temp. of moving stream 14.2° C. at 1:35 P.M. 1" below surface where depth 10". Temp. of pool 10 x 40', max 6" deep was 20.4° C. 1" below surface where depth about 3". The flow on N side of road is continuous. Width of stream 8-10' maximum. No standing water south side of road, but melt beginning with today's warm weather.

C.L. Karlstrom
1955

Bufo boreas

May 10 SW side of Mariposa, 1900 ft., Mariposa Co., Calif.
11:15 A.M. Quick check of toad breeding site. Tadpoles numerous along margins and in deeper slow-moving part of the stream. Stream level same as two weeks ago. Algal bloom more restricted to edges. Aquatic plants beginning to bloom. Alder leafed out. Poppies, lupine on rocky slopes in full bloom. Tad sample taken & preserved. Water temp. in water 1" deep at margin where tads congregated 25.8°C. at 11:25 A.M. In deeper parts of stream (no tads) where moving 3-4 feet per second 15.9°C. Air temp. 2" above ground (bulb shaded) 26.5°C. Adult bullfrogs disturbed at edges of cat-tails. Again Rana catesbeiana tads and Bufo tads occur in same pools.

Stoneman meadow, 4000 ft., Yosemite Valley 8:15 P.M. check here revealed a ♀ and ♂ adult toads, separated by 50 yards, and no signs of successful breeding as yet. Ponds A and most of ditch at B are dry. Some isolated puddles of water. Flowing water on N side of road but few Hyla only.

Ahwahnee meadow this area SW of the Hotel has seep water accumulated in ponds. 21 ♂ toads marked, measured, and released 11:30-12:45 A.M. No ♀. Males appear to have done little feeding, tend to be skinny and small in comparison to Mariposa ♂s. No calls heard. Hyla chorusing. Sentinel meadow well searched. not a single toad.

See data sheets for temps.

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Bufo boreas

May 11 Sentinel Meadow 11:20 A.M. Shifted weather station to Ahwahnee Mdw. Doug Hubbard's max-min for May 5th was 74-30° F. Water level 26 1/2" at 9. A.M.

Todays reading 70-35° F. at 11:30 A.M. Water level 32 1/4".

Water table high in this meadow area with extensive deep meadow pools. However, toads do not select this situation if last nights' census is revealing on this score. I didn't find a single toad out 12:45 - 1:15 A.M. over bridle path, macadam paths, grassy areas, or in ponds. The heavy tufted nature of the grass in this area may be unsuitable for toad progression. Certainly water was available here last summer and is now. Where do toads occupying Govt. residential area to north of Sentinel meadow breed? Ready access to Sentinel meadow seems to be the case.

Ahwahnee meadow revisited 11:45 A.M. Max-min. thermometer placed in weather housing near pond where breeding toads still present. Location is on S or Merced River side of road which runs along the south side of Ahwahnee meadow. One pair in amplexus, about 12 other ♂♂s marked (see data sheets). Water depth 13" on stake set in pond 6 feet from present S edge. Pond A where most toads present runs NW x SE

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Bufo boreas

May 11 is 10 x 16 yards, grassy with a maximum depth of 15-16 inches. Diving beetles seen. Otherwise aquatic life poor, no algal bloom this pond. Ditch-like ponds adjacent to N side have better algae growth. Diagrams later.

May 18 Ahwahnee meadow. 4000 ft., Yosemite Valley. 5:25 P.M. Area marked out (see crude map) for marking study. No adults seen in ponds and no sign of eggs W side of road following superficial check. An adult ♂ (unmarked) found buried in soft loam soil under a cottonwood slab in the middle of the vast open meadow 75 yards N x NE of pond A. and 45 yards W of single living *Populus*. Slab 5' x 1½' x 2" thick, resting on dead fallen grass. This spot littered with dead slabs, limbs, portions of trunks of cottonwood over an area 50 yards across. Most lies in depressions (sinks) where snow melt temporarily stands. A single small (25 x 7 x 8" deep max.) stands 20 yards W x NW of living cottonwood. Bottom of sink 4' below general meadow level. Cloacal on ♂ ad. 19.2° C. at 5:30 P.M. Temp. in loam soil 17.5° C. Air temp. (bulb shaded) 2" above dry grass 24.1° C. No moisture can be wrung out of soil (humus) but under other cottonwood fragments earthworms are at surface. Toads concealed even when ~~board~~ slab lifted since they may occupy *Microtus* runs in grass. I first located this adult by

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Bufo boreas

May 18 Ahwahnee mdw., 4000 ft., Yosemite Valley, Mariposa Co., Calif. - unknowingly stepping on it and it gave a "mewing" sound. Animal returned & spot marked with a piece of wood thrust in ground.

5:48 P.M. Another ad. ♂ under a log 10 x 2 x 4" thick. Lying in damp rotted wood. at soil surface. Cloacal temp. 18.2° C., substrate (shaded) 15.3° C. Air 2" above dry grass 24.0° C. Toad clipped and released same spot. Appears thin, has fed little. This spot only 10 yards WxNW from pond just described.

Ad. ♂ spotted in water of this small pond, dived for bottom. I returned fully 10 minutes later from marking another toad, and this one appeared in same position at bottom of pond 8" below surface. cloacal 5:59 P.M. 23.0° C. Water temp 1" below surface 23.5° C. Released it in water. Another Toad surfaced 5 feet away. Released toad approached it (possibly heard few low tremulous notes) and tried amplexus.

Same meadow 8:20 P.M. Set up stakes around study pond area. Began survey of ponds middle of open meadow. Pair of ♂'s in small pond 20 yards NW of live cottonwood, one marked earlier today, and second just marked. Hyla chorusing here as over all of meadow. Air temp 8:35 9° C. Water temp. 19.8° C. Cloacal of one toad the same. Dark by about 9 P.M. Second pond checked located 10 yards SW of main road bordering SW side of Ahwahnee Hotel grounds.

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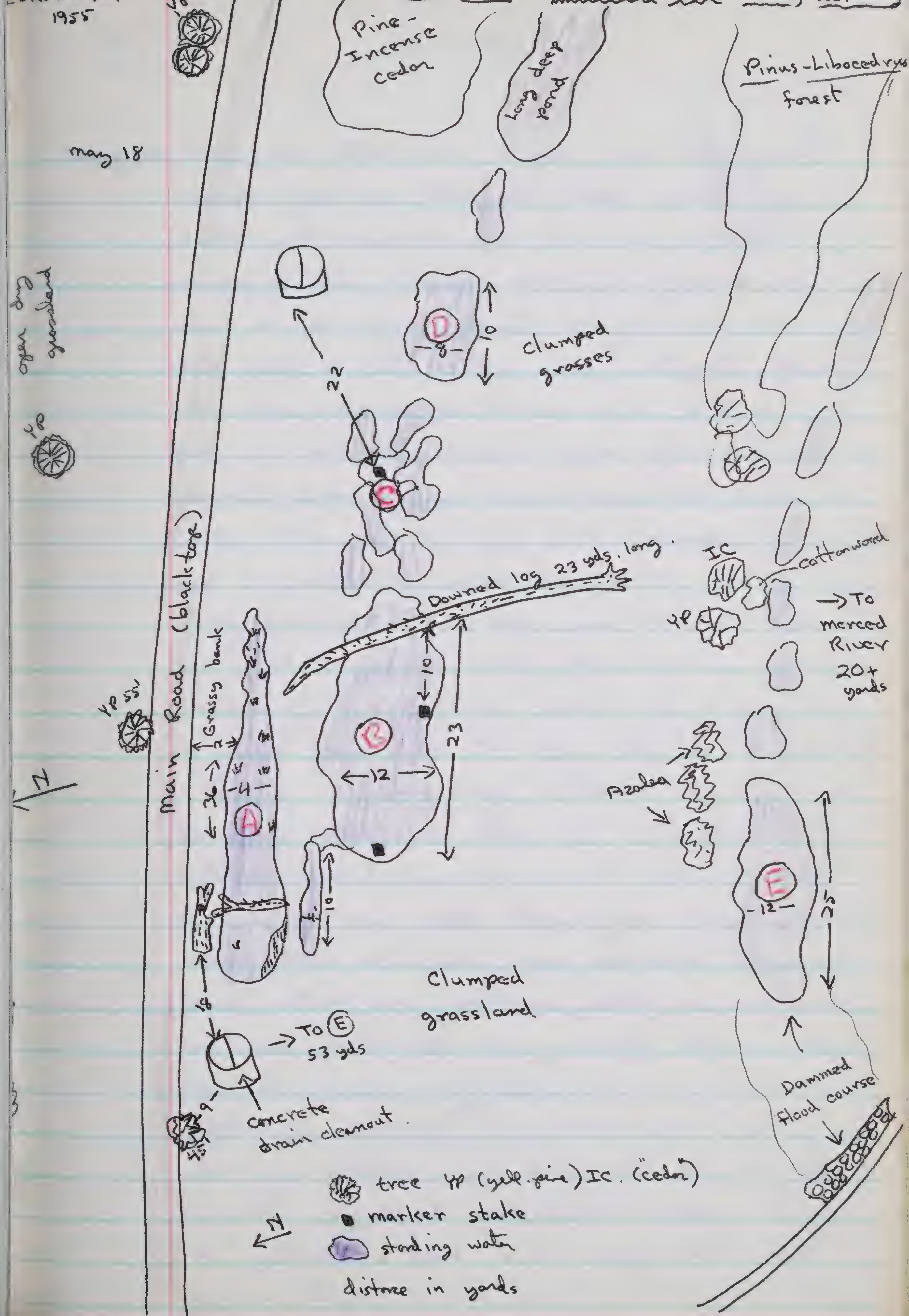
Bufo boreas Ahwahnee mdw. 4000', Yoz. Valley

may 18



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1955

Bufo boreas

May 18 Single ♂ taken here in pool 40' across, roughly circular, no more than 5-6" deep middle and dotted with grass clumps. 9:05 P.M. Started survey of ditch bordering NE side of road which runs on SW side of Hotel. Only 3 males over 300 yards of ditch. Clear water most parts, flowing SE. Then I headed over to deep ponds E x SE of pond D. No toads. Heavier grass here, and I suspect toads require easier access to water. Single ♂ in pond D 9:35 P.M. (unmarked) Pond C water temp. 9:45 P.M. 16.1°C. Air 2" above pond 9.8°C. No toads seen Pond B. Three in pond A, one a recovery from previous week. (Ponds S of pond B were checked. One recovery and a single new adult ♂. — this later at 11:15 P.M.)

Check of Stoneman mdw 10:15 – 11:10 P.M. No toads in what water there is. A single adult ♂ bullfrog removed from cold (8.5°C) flowing water N side of main road. Escape from Ahwahnee pond? Adult ♂'s and couple young ♂ toads (2 yrs. old) found active over pathways, sandy areas adjacent to road leading to Curry. Usually hid in leaves before being seen. Air temp. 10:30 P.M. 9.3°C.

Return to Ahwahnee mdw 11:15 P.M. Some increased activity as additional (4-5) males out, but no ♀'s. Footpath and adjacent ponds Sentinel meadow 11:40 P.M. yielded no toads. (See working data sheets for some temps.

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Bufo boreas

May 19 Ahwahnee Meadow 7:30 A.M. Sun just beginning to flood study area. Azure blue skies. Air temp. 10.1° C. (bulb shaded) above wet dew-covered grass. Pond B temp. 13.4° C. 1" below surface where water 8-10" deep. No signs of toads although water temp. is sufficiently high for their activity. Air temp. may be limiting (?)

Same locality 5:10 P.M. Switched max-min. station to S side Pond B. Also set up tub with Tag and Taylor thermographs inside. Present water temp. 80.5° F. Air 70.5° F. in tub at 6:10 P.M. Hyla quiet until about 5:30 when they called intermittently for a short period of minutes. A single adult toad pond A, 10 yards SE of sprog emitted a series of notes from its position 2/3 rds immersed in the water inch or so deep. 10-12 notes descending in pitch, not a trill but delivered in rapid order. Called three times. I heard it first about 5:40 from a point 25 yards S of it. The sun descended behind the Valley wall at 6:15. The effect on Hyla was almost instantaneous as a dozen males began chorusing; moving right out into positions all over pond (or revealing themselves from already occupied positions.). No toads heard at this time.

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Bufo boreas

May 23 Joe Hall returned from trip to Sagehen Creek with Bob Hoffmann. Joe collected one adult ♀ 30 feet from Sagehen Creek under a jutting rock on a dry slope. Locality:

3 mi. NW Hobart Mills, 6400 ft., Nevada Co. Calif.

Animal died enroute to Albany. Joe reports having seen but 3 (adult) toads during his past two summers at Sagehen. These were large toads, larger than ♀ delivered today. Hoffman corroborates Joe's statements as to scarcity of toads in area. None ever seen breeding nor have toad tads been found. Rana (b. sierrae?) muscosa are common in Sagehen Creek proper and behind beaver dams.

E L Karlstrom

Bufo boreas

May 24 — 1.3 mi. N, 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif. - 3:30 P.M. This area not visited since March 23, 1955. Pond A has dried up to a point where only 1/5 of original pond area is covered by water. Maximum depth 15-16" largest pool on west side. Heavy sedge & cattail growth, latter to 7 feet. Water slightly muddy. Water temp 1" below surface in water 10" deep (many tads) 27.8°C. at 3:37 P.M. Air 2" above water, bulb shaded 21.9°C. Undisturbed tads select surface layers of water probably for optimum temps. Little algae in bloom. *Hyla* and *Bufo* tads scraping detritus off sedge and grass stems. Largest *Hyla* tads ~~3/4~~ 20 mm. body length, *Bufo* smaller < 15 mm. body length. Widespread dispersion of numerous tads over all available water suggests matings subsequent to my March 23 check. *Bufo* and *Hyla* have emerged, are hopping about over muddy areas adjacent to pond. Hazy sun today, sky 1/4 clouded light ~~cumulous~~ cumulous type, wind strong from S & SW. Largest metamorphosed toads about 12-13 mm., tail resorbed. Most of these are at N end of pond A suggesting that they resulted from eggs I had observed at this end of pond. One yearling (44 mm.) found in sedges N end.

LKarlstrom
1955

Bufo boreas

May 24 Richmond, Contra Costa Co., Calif.

Pond A
W side Santa Fe tracks

Pond B on E side of same tracks is shrunken to about 1/3 original size. Entire southern neck (1/4 of original pond) is dry. Tadpoles numerous here as also at pond C NE side of Santa Fe tracks.

Elkadstrom
1955

Bufo boreas

May 26 Phone conversation with Gunter Hertling now living at 2433 Waring, Berk. 4, Th. 5-0242. A Zool. 113 student spring of 1952. For past couple of summers he has been working for Montecito Boys and Girls' Camps, packing groups into Sequoia Natl. Park. Reports seeing toads (most likely) in lush vegetation where stream cross path about 200 yards beyond Bear Paw Mdw. on trail to Hamilton Lakes from Giant Forest, about 8000 ft. Sequoia Natl. Park. He suggests contacting naturalist Floyd Brown at the museum Giant Forest.

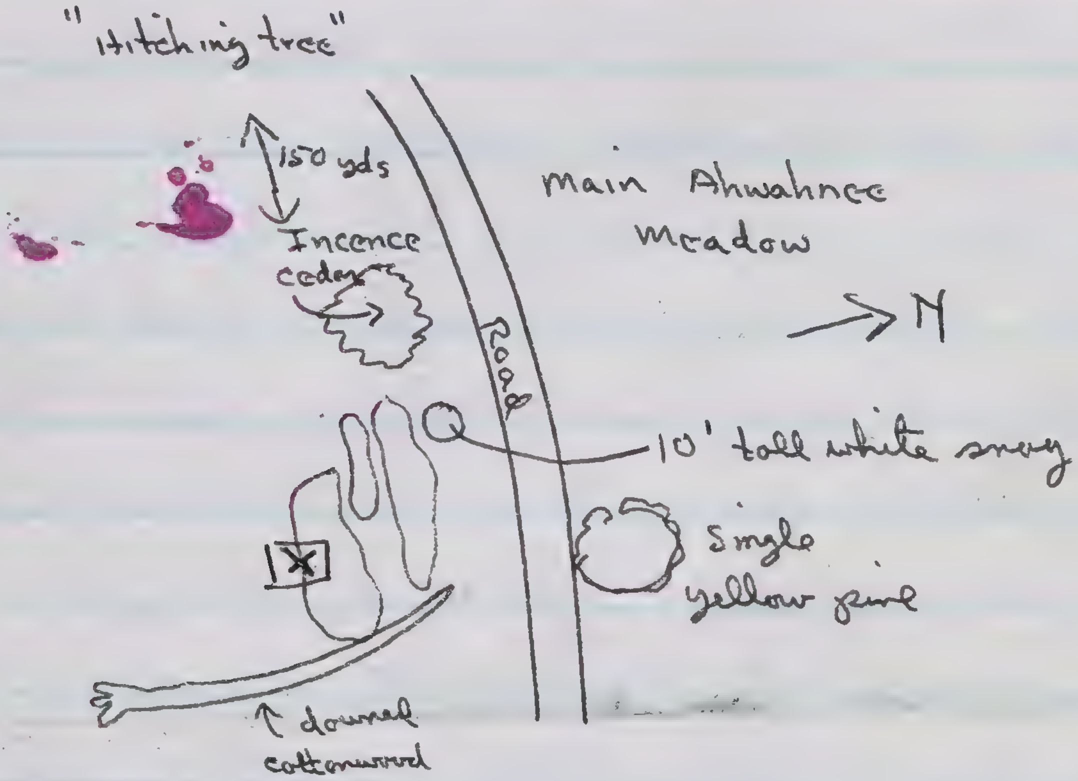
From C.D. Holliger's field notes June 27, 1912. Confusion exists in my mind over precise locality of *Bufo boreas* taken east side of Kearsarge Pass Inyo Co., Calif. Catalog lists Kearsarge Pass as locality (would be 11,800 ft.) but field notes show toads may have been taken at Grays meadow, 6000 ft. after he had packed out from Flower Lake, one of string east of Heart Lake.

E L Karlstrom
1955

Weather Station check
Ahwahnee Meadow

(Doug Hubbard took data)   May 27 if possible.

Max-Min key #2
Tub " #7



ell, this
dn't concern
ou at all!

On round chart note jog in my use of scale. 100° chart = 80°, etc. This way I get more accurate readings. Ink with air thermograph but shouldn't be necessary to refill after only a week.

2 of each chart in case you tear one.

Hammers are YNH's. I came back too late.
Thanks!

	5-25-55	6-2-55
Max	92.5	90½°
Min	38°	35°
Water height	26.75 in	25½"

E L Karlstrom
1955

Bufo boreas

June 5 Ahwahnee Mdw., 4000 ft., Yosemite Valley 7 A.M.
Serviced instruments at weather station. Pond level is up. Stake reads 22½" depth. Hyla and Bufo toads present Pond B at least. max-min. (air) 90°-39° F. Pond Temp thermograph recording ca 0.5-1.0 C° high but I left it as is. Hubbard appears to have set chart about last Wed. (?)

I Night check of meadow 10:00-11:15 P.M. Evening clear and mild, practically no breeze. Air temps. ranged 14.5-15.5° C. and evening coolness had not set in by time Drew and I finished survey. About 7 adult ♂'s were toe clipped. One recovery of a toe marked adult on "Hotel road" NE side of the west meadow. Movement from original marking site about 100 ± yards. Only one toad was recovered in the water. This ♂ first seen swimming in 8-10" water of ditch SW side of Hotel Grounds. No males at calling stations. Breeding probably thru except for possible late emergence of females. Over 50 ♂'s have been marked since early May and only one ♀. There must be more ♀ emergence. I would estimate 3-4 matings pond A & B from number of toads present. None collected tonight.

A warm mild evening. Toads probably out feeding on spiders, etc. especially along dirt footpaths. Some toads found in heavy clumped grasses near Pond B. See working sheets for temp. records. (A47, A49)

E.L. Karlstrom
1955

Bufo boreas

June 6 Ahwahnee Mdw., Yosemite Valley 10:00 A.M. Clear and hot today. Meadow in full sun. Light breeze from west. Pictures taken:

35 mm. #20 1/50th at F8 facing W x SW toward Pond B

#21 " " " same but closer up.

Voigtlander camera

#1 1/100th at F11 Plus-X Same view as Kodachromes.

2 & 3 Closeups (2½') of tadpoles in Pond A

Algal scum 1/100th F9.

#4 facing W x NW down Pond A 1/50th at F11.

Water temp. surface ½" where tads photographed 24.6° C. at 10:50 A.M.

Drew Hidy collected tadpoles - sample of all sizes at NW end of Pond B. More present Pond A. Single mating Pond B? Several Pond A.

Max-min 11 A.M. 94-49° F. Present 84°. Wound up clocks on thermographs but left charts. Too may be running fast. Hubbard will service equipment next Monday or so.

~~Meadow~~ Phenological picture. Sedges have flowered for most part are 2½' tall. Oaks leaved out.

Huntington Lake, 6950 ft., Fresno Co., Calif. 9-10 P.M. A.E. Culbertson of Fresno State has reported seeing Calif. toads in area of old school which is about ½ mile E of the Post Office & Lodge. We checked area out tonight but no signs of toads or good breeding situation. Wyeth (sp.) has bought these

E L Karlstrom
1955

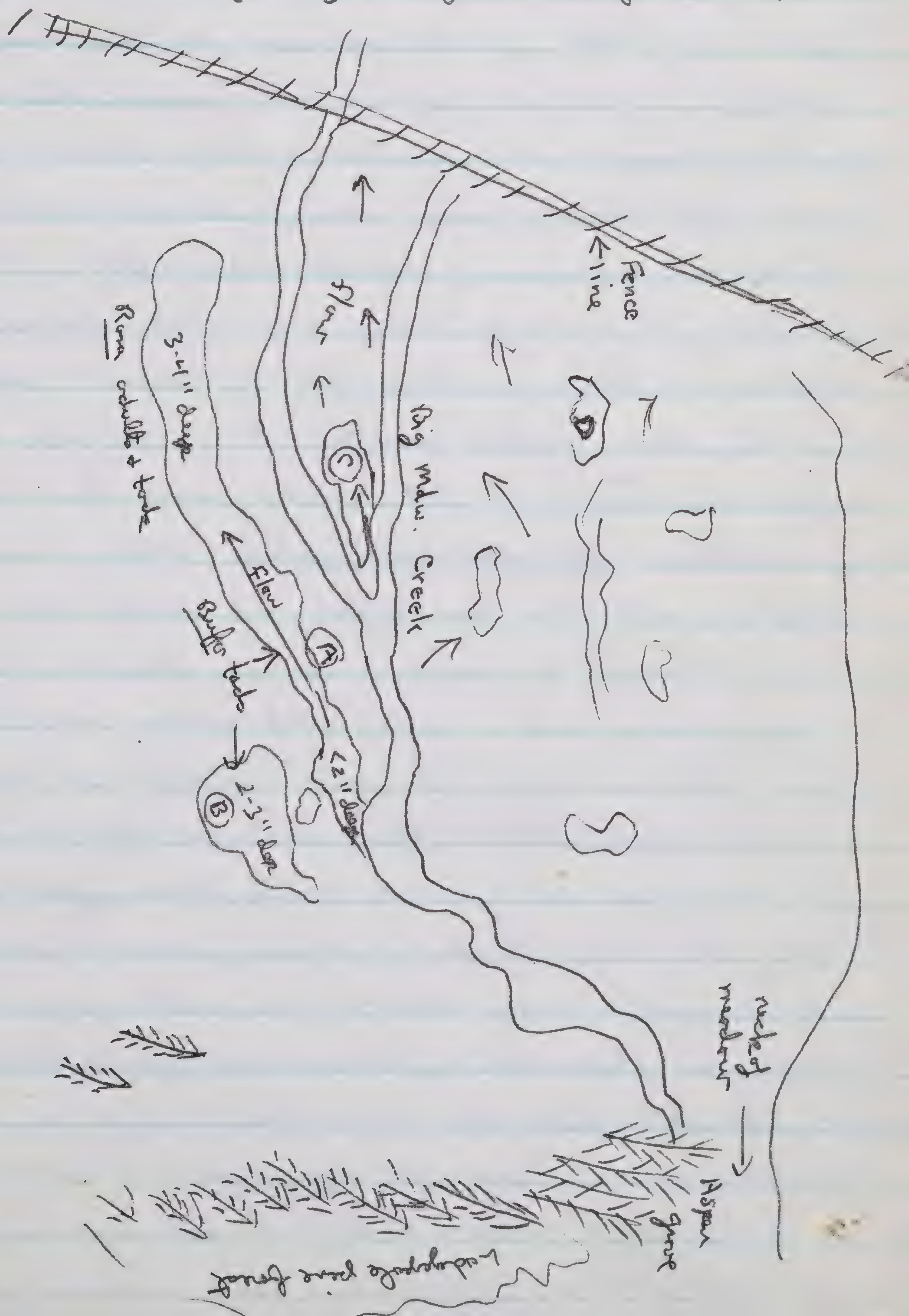
Bufo boreas

June 6 buildings and grounds. He reports not seeing any toads on the property. Air temp. 13.8° C., clear, cool, no wind. Hyla (3) and one Rana taken from swampy area ¼ mile E of Will'o the Wisp Store & Cafe. Boggy pasture with flowing & standing seep.

E.L. Karlstrom
1955

Bufo

June 8 Horse Corral meadow, 7645 ft., Fresno Co., Calif. Sierra National Forest 4:30 P.M. South margin of Big meadow Creek about 60 yards W of lodgepole pine stand. Tadpoles are not dense but sparsely scattered over a surface course 60 ft. long and from 4 - 12 ft. across.



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1955

Bufo boreas

June 8 Horse Corral mdw., 7645 ft, Sierra Natl. Forest, Fresno Co. Calif - air temp 4:45 P.M. 26.1°C. 2" above damp meadow (bulb shaded) Water temp. at (A) 21.8°C. Temp at (B) 31.9°C. 1" below surface. A & B pools appear to be separate, B about 2" higher. Tads in both are dispersed, not very numerous (2-3 per foot square average) and could represent two matings. The flow is westward in A which might account for wide dispersal of larvae. Creek is meandering, varies from 3-4' to 25' across with a half dozen "cascades" of a foot or two each. Approximate flow is a yard in 2-3 seconds between drops. Meadow at this point is about 200 yards E×W and 250 N×S with continuing narrower necks to E and South. Horse manure dots the grasses + sedges which are to 10-12" tall. Dodecatheon, Ranunculus scattered & blooming. Aspens are half leaved out (leaves ½ full size) Lodgepole pine stands form all border to this vast open meadow but Jeffrey & Sugar pines appear amongst the lodgepole. Drew Hiby found more tads (same stage) at (C) a shallow silty bottomed seepage flow 2-3" deep. Water temp. 20.2°C. Now many more groups of tads found N of site (C). Sink holes, ditch like seepage flows here. Meadow boggy. One sink 12'x20' and max. 8" deep so brown-stained tads hardly can be seen. These are larger (sample taken) and thick. Water temp. 31.0°C. at 5:20 P.M. Large Hyla tads present in this pond (D). So far tads from 8-24 mm. observed and no eggs. Rana muscosa adults abundant along with yearling toads.

ELK [illegible] 1955

Bufo boreas

June 8 Horse Corral Mdw. 7645 ft.

Apparently Rana has not bred since we found no eggs in stream or at edge. Main Creek has temp. of 18.2°C.

- 9:10 P.M. Night check of same meadow with our night lights. No calling heard from edge of meadow except for a few Hyla 200-300 yards away. 2 adult males found on horizontal log siding from an old cabin. Cloacal of one 18.2°C. at 9:14 P.M. Substrate (dry logs) 11.5°C. Air 2" above logs same. Large for ♂'s. Fairly distinct vertebral stripes, greenish-tan ground color. Much rust on warts and heavily blotched with black.

Adult ♀ collected 10:20 P.M. Cloacal 9.2°C. Air 9.0°C. above dry log where ♀ sat. N margin of meadow. 10:35 P.M. Adult ♂ on large granite (dry) boulder. Cloacal 14.2°C. Air 1" above rock 14.0°C. This last toad was caught near the Govt. Packing station (cabin) on NW edge of meadow. There were no call notes 9:10-10:45 P.M. tonight, and no toads found out in the soggy meadow. All collected were at or near meadow pine margin, and all were up on dry logs or on the rock as the last one. Some rainbow trout were up in flowing shallows at edge of Creek. We flipped two small ones out (< 6") and checked guts for signs of tadpole predation. Insects (crane fly?) and detritus only. Trout in this situation may take the abundant tadpoles. 5 Rana collected in or near Bufo tad pools were killed & preserved tonight for later stomach analysis. Zweifel reported

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1955

<u>Bufo boreas</u>

June 9 <u>Corral meadow</u>, <u>7645 ft</u>, <u>Sierra Natl. Forest</u> — <u>canorus</u> toads as <u>R. muscosa</u> food. Under logs where first two toads collected we took 3 young <u>Thamnophis</u> <u>elegans</u>. Another one same size and a larger adult got away. No <u>Hyla</u> seen but a few males were calling from distance. The scarcity of <u>Hyla</u> toads is unusual since varied breeding sites available. Pond (D) (see map) had a number of <u>Hyla</u> but 1/10 as numerous as <u>Bufo</u> toads.

We covered almost the entire meadow area tonight concentrating on the margins. No toads seen up under pines in dry duff where I expected them. No toad eggs observed. Breeding here appears thru. Tadpoles are at same stage as <u>boreas</u> in Yosemite Valley even though we are now 3600 feet higher. Selection for early breeding in montane <u>boreas</u> as well as <u>canorus</u>? Seems so.

June 10 Drew and I hiked up the trail about 2½ miles to Summit meadow, 8000+ ft. <u>Rana</u> abundant, a few <u>Hyla</u> subadults taken, and <u>Batrachoseps</u> under pine logs (see <u>Bat.</u> species account) Small patches of snow up under trees but meadow clear and lush. Fair gradient here although shallow seep water available to toads. <u>Bufo</u> probably has not pushed up into this particular meadow.

Photo (Kodachrome) #25 taken of Horse Corral meadow facing southward toward some pools where toads present. The creek is just beyond.

E. L. Karlstrom
1955

Bufo boreas

June 10 Long Meadow, 7500 ft., 3 mi. N x NE Giant Forest, Sequoia National Park, Tulare Co., Calif.

Tadpoles found in seepage (rain?) pool at east limit of meadow where Wolverton Creek flows out into meadow. Area open and cleared up by bulldozer preparatory to development of this area for campgrounds, etc. 5-6 separate shallow (max 4-5") puddles which probably were originally one larger pool. Largest puddle now 20' x 25'. Water temp. 1:05 P.M. 1" below water surface 32.5°. air 19.5° C (bulb shaded). Tads spread out but most numerous at shallow edges. Wind fairly strong from SW so air temperatures cooler today than yesterday. Drew noted this pool yesterday and remarked how it was shrinking. From his boot marks at pool edge I estimate a vertical drop of 3/4" resulting in 2-3 feet "tidal drop". Today I counted 28 tads in the neck of one puddle obviously stranded, ~~their~~ backs out of water. Two size groups <12 mm. and 20-25 mm. approx. Larger are at same stage as those gotten Horse Corral meadow north of here at 7645 ft. Bottom of this pool mixed sand + mud, no green algal growth visible. Tads scraping detritus from bottom and from surface film. Water a brown-stained color.

-1:50 P.M. Survey of meadow. Variety of breeding sites available and toads not highly selective. One slow-moving 2' ~~wide~~ 2' deep had tads (temp. water 22.8° C.). These may have washed into rivulet from seepage pools adjacent. This meadow is half boggy, half dry sandy ground. Logs, rodent burrows, surround forest all available for retreat. We turned all available litter but no toads.

ELKarlstrom
1955

Bufo boreas

June 10 Long meadow, 7500 ft., Sequoia Natl. Park

- There is an apparent lack of diurnality exhibited by adults at this altitude — at least now when peak of breeding is past. Branches of Wolverton Creek have been dammed up for water supply. W end of meadow has an artificial lake 200 x 125 yards. Edges are swampy with sedge to 14-16" height. Batch of toad eggs (~~a~~ near hatching) and hatched out larvae present. Strings of toad eggs over total area 4'x 8' but masses concentrated several spots. Water temp. 23.4° C. at 2:05 P.M.

Same locality 9:03 P.M. night check with head lamps. Adult ♂ edge of reservoir Cloacal 11.5° C. Air temp 1" above dewy meadow 7.20 C. Water 1 foot from edge 2" deep 9.1° C. Hyla chorusing (2-3) but no Bufo notes. 9:15 P.M. Dead male adult in water at edge of reservoir. Stomach slashed as if by a bird or carnivore but toad otherwise intact. Fungus growth over skin surface. 9:35 P.M. adult ♂ walking over dry gravel seemingly toward water in meadow. Cloacal 9.1° C. Air 1" above dry substrate 5.8° C. Following a check on foot for 45 min. we started driving the dirt & crushed rock roads ramifying thru this meadow area. 5 more toads gotten to give a total of 8 — 6 adults, 2 subadults. At the shallow seep pool described earlier today where tadpoles taken, we got an adult ovigerous ♀. Water & cloacal temp 16.2° C. 9:50 P.M. An adult ♂ was in water 8' from ♀ but we heard no calls from him. A subadult also in water along with a large Rana.

E L Karlstrom
1955

Bufo boreas

June 10 Long Mdw., 7500 ft, Sequoia Natl. Park
- The latter pickled first thing for stomach analysis. Feeding on tadpoles? Quit night search 10:45 P.M. Air temp down to 6.2° C. by then. Breeding not over this meadow since 2 ♂♂'s, one ♀ found in water and other ♂♂'s probably heading for water.

June 11 Grapevine Canyon, 6 mi. SW Brown, 2600 ft., Kern Co.
adult ♀ on gravel-dirt road. Cloacal 24.4°C. at 9:05 P.M. Dry fine gravel 20.1°C., air 1" above it 17.5°C. Appears to be headed upslope into sage. Insects abundant around our headlights. Small creek 100 yards down 30° slope to N. Hyla heard this stream area near large irrigation (?) pipe. Medium sized regular spots with much red on this female. A different appearing boreas. No eggs - would appear to have bred but no signs of eggs or larvae along stretch of creek we searched.

June 13 Deep Springs Valley, 4 mi. SW Deep Springs P.O., 5000 ft., Inyo Co., Calif. Search made for the springs in vicinity of the dry lake bed which is now a dry saline bed. We approached the area from the north by driving down a narrow rutty road from the School. Nothing found in vicinity of operating wind-mill near on SW end of the lake. By 3 P.M. we found a marshy area after seeing cattle there. Located about ½ mile N of the dry lake. Marsh 40-50 yards x 75 yards with pools to probably 3-4 feet depth.

E L Karlstrom

Bufo (boreas) exsul

June 13 Deep Springs Valley, 5000 ft, 4 mi. SW Deep Springs P.O., Inyo Co., Calif. — The sedges are tall here to 3-4', mucky soil very black. Cattle have trampled adjacent area heavily so the grass is clumped and matted. Soft ooze up to your knees many places. 3:45 P.M. Drew Fitch found single adult exsul. We withdrew a hundred yards or so waiting for dusk and the chance to tape record undisturbed toads. No calls but those of blackbirds late afternoon. Recording began 7:15 P.M. A few Bufo notes were mixed in with the bird calls and a couple of spadefoot notes. Call is B. boreas halophilus like but slightly higher pitched — up to 3-4 notes in a second ± time almost uniformly spaced. No real Bufo chorus heard. Adults and tadpoles not easily collected. Method for getting adults was to walk along parting the sedges and watching for movement. The dark body against the black soil is hard to spot, and the light vertebral stripe was highly disruptive. Marsh a beehive of activity as darkness set in with a dozen Texas (probably) nighthawks catching flying insects, blackbird, and amphibian calls. Air temp. 15.8°C. at 9 P.M.: About 14 adult Bufo collected (more — to 25 seen but 10 left there) along with Bufo and Scaphiopus tadpoles.

E L Karlstrom
1955

Bufo boreas

June 17 Ahwahnee Mdw, 4000 ft, Yos. Valley ~ 11:30 A.M.
Check of weather station last checked by Doug Hubbard
June 18. max. 98 min. 46. Water depth 20-20½"
note the air temp. exceeds that gotten at Headqtrs.
weather station by about 3 degrees. (95° June 8 Y.M.P.)
max.-min. 82-40° F. Water level Pond B 16½"
Adjusted pond thermograph which was off in timing,
a few degrees F. high in temp. Hyla and Bufo toads are
larger, harder to net. A pond sweep made for
bottom fauna - 2 6' sweeps Pond B. Clear, warm,
breezy today. Sedges & grasses to 3' height. Western
azalea beginning to blossom. Oaks & cottonwoods leafed
out.

June 19 1.3 mi. N, 0.2 mi. W Civic Center Richmond,
Contra Costa Co., Calif. Night search 9:30 -
10:35 P.M. for toads. One adult ♂ (unclipped)
and a juvenile collected Pond A area west side
of Santa Fe roadbed. ~~Pot~~ Water dried up here
but some moisture bottom of pond C; water &
tadpoles small area pond B. Clear cool night.
Members of this population must spread out
over vast area for nocturnal post-breeding feeding
activity. I covered a lot of ground to find
two toads. Small recently metamorphosed toads
under old logs pond A.

E L Karlstrom
1955

Bufo boreas

June 24 Ahwahnee Mdw., Yos. Valley. max-min. 96-36° F at 1:40 P.M. Present reading 83° F. clear skies, windy. I raised Taylor air thermograph 2° F to 77°. The Tag water thermograph is quite accurate, running somewhat fast but ± 1° of temp. I got with Shuttleworth quick-rec. thermometer. Pond level to 9 3/4". The float is resting on grasses although the staked end is still floating. I moved the float out deeper. Pond A 2/3 rds of maximum water, Pond B 1/2 original area. Wet bottom margins a dense mat of wet green grass. Stranded Hyla and Bufo tads few per square yard. Bird droppings abundant. Half dozen Brewer's blackbirds now in this area. Microtus openings in marginal matted grasses. Bufo tadpole with hind legs developed in depression in soil 2x2x 3/4" deep. Was stranded once as I watched but flipped back into the depression, no way to find deeper water. Water temp 29.5°C. at 2:15 P.M. No emergent young found edge of ponds. Sample of tads taken.

Brief night check here 10:15-10:45 P.M. yielded no adult toads. Single ♂ Hyla heard in area. Cool evening but clear. night air charged with campfire smoke. Tall grasses in pond area seems unsuitable now for toad locomotion. Yet none seen on pathways or edges of road.

Sweeps (about 20) made of pond B with long handled dip net. Hyla outnumber Bufo 20 to 1 this pond. Aquatic insects abundant same as one week ago. No Bufo gotten middle of pond. Hyla

E L Karlstrom
1955

Bufo boreas

June 24 Ahwahnee meadow, Yosemite Valley.
occupy deeper parts of the pond; toad larvae at the margins. not a temperature factor necessarily since the Hyla will usually occupy the upper warmer water layers where it ~~it~~ is just as warm as the margins. This ecologic segregation insures full utilization of the pond area.

June 27 Charity Valley, 7700 ft., Alpine Co., Calif. We searched roadside area in Faith Valley a few ~~few~~ miles north of here but found no signs of toads. There is an adult boreas in MVZ collection from Faith Valley taken by RE Smith. night air temp. last night at 9:35 P.M. was 6.5° C. no breeze but a cold evening. Both evening & morning checks in Faith Valley. At 10:30 A.M. we drove up into Charity Valley, another long open meadow grazed by cattle. Small streams meander thru flat area. Clumps of willow leafed out and to 15' height line parts of stream channels. Tadpoles found along margins of pond 75 x 60' x 5' deep middle. water temp. 10:46 A.M. 22.1° C. at edge in water < 3/4" deep where a group congested. Temp. 16.8° C. 3' out, 6" deep, where scattered toads present. live & preserved samples collected. mixed sand and gravel bottom. Sedges line margin, are to 10" height. Willow clumps in middle of pond & along margin. Corn lillies (opened 1/2 way) and Ranunculus in bloom are prominent plants. Air temp (bulb shaded) 17.2° C. at 10:55 A.M. Clear skies, warm, no breeze.

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1955

Bufo boreas

June 27 Charity Valley, 7700 ft., Alpine Co., Calif..
- swarming mosquitos & flies miserable as I write. Water semi-clear. Some logs near edges. Turned over but no toads. Pond adjacent to road fenced off from pasture so cattle apparently do not water here. Deer tracks many. Rana adult collected pond margins.

Voigtlander 4x5 camera

#4 Plus-X 1/100th F10.5 facing pond toward W x SW from point 60 feet away.

#5 closeup of tadpole margin of pond. F8 at 1/100th

Kodachrome #1 facing N x NE up Charity Valley with pond & willows foreground 1/50th at F8.

Continued up road to Blue Lake. ½ mi. E x S E of the Riggle, 8200 ft., Alpine Co., Calif.
Adult (small) ♀ found in plugged pocket gopher burrow in field of corn lilies. Cloacal temp. 23.7° C. at 12:25 P.M. Air temp. mouth of 6" deep burrow (bulb shaded) 19.9° C. Sun hits 3/4ths of bottom of burrow which is 2" wide at bottom, 6" at top. Ground is moist just under surface but no water can be squeezed from crumbly ball pressed between fingers. Open meadow with rocky outcrop margins & very scattered lodgepole pines. Some boggy small pools at seepage areas. abundant patches of willows (to 10') and corn lilies. Grasses + sedges, buttercups blooming, plantain (?) to 6-8" Pasture land. Snow on rocky N-facing slope - meadow

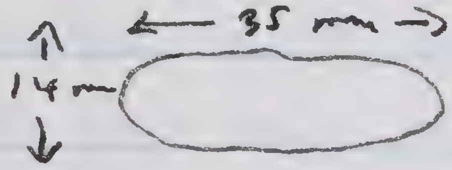
E L Karlstrom
1955

Bufo boreas

June 27 ½ mi. E x SE of the nipple, 8200 ft., Alpine Co. Calif

300 yards wide & ¼ mile long SE x NW. Gently 20-30° sloping hills border meadow averaging 100-200 feet height. The nipple lies to W x NW of this meadow. 8000 ft. ¾ mi. E x SE nipple

Another meadow over to W of road checked. Curious sausage shaped membranous sac filled with insect fragments found in seepage flow. Sac is gray from outside. I saved what remained after I had punctured it. Could this be an unusual fecal sack? Water 1" deep gently flowing seepage flow 2½' wide.



~~3/4~~ 1/2 mile E x SE of the nipple. 8:14 P.m. adult ♀ down in another pocket gopher burrow among corn lily patch. Cloacal temp. 13.8°C. Air temp. burrow substrate 14.0°C. Air temp. 1" above ground 10.5°C. Moderate breeze, sun behind ridge. Burrow 7" deep, 2¼" across – a tight squeeze for toad which must have backed down in.

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Bufo boreas

July 4 Ahwahnee Mdw., 4000 ft., Yosemite Valley, Calif. Check of weather station.
Max-min. 88-37° F. 8:20 P.M. I shifted the thermograph tub 10' in toward shrunken pond B which now has water surface area of only 12' x 25'. The depth marker has been stolen but I estimate present level as 4½" at same site. The float was high and dry - has been for at least several days. It now floats in water 3½" deep. Tadpoles concentrated vast numbers small area. Pond A also shrunken to ½ original size and depth. Water stagnating. Sedges & grasses to 4' height. Cow parsnip coming into flower. Western azalea just about bloomed out. Adult ♂ LF 2+3 recaptured 8:35 P.M. 35' SE of weather station at pond B. Cloacal 14.1° C. Air 13.8° C. 1" above wet grass. I thought at first it was a _Microtus_ which are busily cutting grass in pond area. One meadow mouse was holed up under tub I moved.

July 8 Check of Ahwahnee Station. Max-min. 5:10 P.M. 87°-35° F. Thermometer left in position but I removed the thermograph tub since the pond is all but dried up. Bare shallow stinking puddles to 4-5' width. Maximum water depth Pond B to 1½". The float for hydrothermograph was high and dry. Pond bottom mucky wet but much of surface has dried out. I netted in ponds A, B, & E but got only _Hyla_ from hind leg stage to emergent toads. Not one _Bufo_ left and I have not found a

E L Karlstrom
1955

Bufo boreas

July 8 single metamorphosed toad in any Ahwahnee pool. Since many toad larvae were present as late as a few weeks ago I suggest that Hyla has a greater tolerance for temp. and possibly low oxygen, salt etc. Cannibalism and Hyla's carnivorous ~~habits~~ habits may also be a factor in weeding out toad larvae. As I approached pond A this afternoon a flock of 8 Brewer's blackbirds flew up from margins of the puddle. Extensive bird droppings at edge of puddle added evidence for avian predation. Sun hot. There were no large numbers of insects on mud surface. Two adult toads collected in grasses, one (ad. ♂) near S edge pond B, the other (ad. ♀) in grass near pond E. Diurnal foraging possible due to heavy grass cover providing a good 80% shade canopy. All known toad breeding sites apparently dried up this area. The outlook for successful Bufo reproduction had seemed good Ahwahnee meadow. High "pond" temperatures recorded today where Hyla present 30.1 °C.

See July 29 for toad hatch.

July 19 ½ mile E x S E Nipple, 8200 ft, Alpine Co. Calif. 4:30 P.M. Check here at locality where 2 adults collected June 27 of this year. Clear warm afternoon but not a sign of toads or tadpoles. Corn lilies opened up fully or almost so. Ground surface drier but still moist in low areas and in gopher burrows. Suitable breeding sites appear to be present along

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1955

Bufo boreas

July 19 ½ mi ExSE Nipple, 8200 ft., Alpine Co. Calif. - the shallow but still flowing creek. Rana muscosa adults present but no Hyla found. Extensive search among corn lilies, rodent burrow openings, and margin of willow clumps. No toads.

Charity Valley, 7700 ft., Alpine Co., Calif. 5:50 P.M. A brief check of this pond and adjacent area revealed not a sign of larvae or transformed toads. The pond is 2/3rds dried up with maximum depth of water about 16". Mud damp and cracked around margins. Paul and I turned over logs & stones around pond without recovering a single toad. There was an abundant batch of tadpoles in late June, and I would expect metamorphosed toads to be present - or larvae still in the pond. Water beetles (Dytiscus sp.? etc.) numerous. Water brown-stained slightly but no particular heavy odor of methane usually associated with such ponds later in summer.

Faith Valley, 7500 ft. Alpine Co., Calif. Paul and I discovered larvae in a couple of seepage streams adjacent to the main creek. Water backed up in places, shallow (to 10-12" maximum depth. Water temp. 20.8° C. at ~~[illegible]~~ 6:45 P.M. Some tads along edges of main 20-25' wide creek; probably washed into creek from seepage pools on meadow surface. Difficult to capture more than a few dozen larvae.

E L Karlstrom
1955

Bufo boreas

July 20 6 mi W Ebbetts Pass, 7700 ft., Alpine Co., Calif.
9:10 A.M. Tadpoles discovered in a small meadow seepage pond. Kodachrome # 10 taken facing NW 1/50th at f9. Meadow runs NW x SE 120 yards by 30-40 yards wide. Lodgepole pine - red fir association. A small trickling creek runs length of low gradient meadow, averaging 2' width but holes to 14-16" deep. Rana adults numerous. Ambystoma macrodactylum under logs edge of boggy meadow. Pond irregularly shaped 25 x 8' with max. depth 8" middle. Water clear but half broken by green grasses to 16" height. Would appear to be a single toad hatch. Larvae hind legs developed, are large - to 1" total length. Water temp. 14.6°C. at 9:20 1" below surface. Air temp. 1" above damp grass 18.2°C. Hyla present but few in number. Rana adult in pond. Predation on tadpoles? Total toad population may be less than 500. Common monkey flower predominant meadow bloom scattered corn lillies. Bottom of pool mixed sand and silt. The tadpoles well spread out. It took Paul Elkins and me over ½ hour to collect 30-40 tadpoles. These were carried out in a canteen. No sign of adults under logs meadow margin. Again B. boreas does not appear to be diurnal at higher elevations. This locality puts boreas within 5 miles of Twiggs's 1952 canorus locality

E L Karlstrom
1955

Bufo boreas

July 20 in upper Hermit Valley and at the same elevation. The canyon of Hermit Valley between the two localities appears rocky and steep for the most part, but there may be suitable toad breeding sites somewhere along the Mokelumne River. Area quite dry now. Should be checked in late June or earlier. Deer Creek, above which the boreas toads were found, is a north tributary of the Mokelumne.

ELKarlstrom

Bufo boreas

July 29 Ahwahnee mdw., 4000 ft. Yosemite Vallley
Removed last of temp. equipment from meadow 6:45 P.M. max-min 97-39° F. Pond A & B had moist muck bottoms. Turning logs at bottom of pond A yielded 3 metamorphosed toads active on wet mud surface. First sign of successful toad hatch 2 years. Length S-V of toads: 13.2, 14.8, 12.6 mm. Recently metamorphosed Hyla present under some logs.

Aug. 23 Same locality. Night check 8:15-9:05 P.M. yielded two adult ♂♂ toads at SE corner of meadow along the bridle path. Neither had been toe clipped. No toads found near of ponds A, B, etc., or over open grassland. Mild evening with air temp. in high 60's. Toads very active. ELK #808 testes & stomach preserved. S-V length 81.2 mm. Dorsal color olive-brownish drab with black blotches < 1 cm. length. Venter wholly unspotted.

Aug. 27 Color notes on ELK #809. S-V length 89.5 mm. Ovaries expanded, eggs < 1.4 mm. diameter. Fat bodies not ~~greatly~~ greatly expanded.

Sept 8 Ahwahnee mdw, 4000 ft, Yosemite Valley
7:00 P.M. Check of study area. At pond A I found 5 of this summer's metamorphosed toads. S-V length about 3/4". These are larger than yearling B. canorus I found in June and July at Tioga Pass. A large single

E L Karlstrom
1955

Bufo boreas

Sept. 8 adult ♀ active in grass 7:20 P.M. near long deadfall log at E margin pond B. Toad collected for experimentation. Sedges still green and tall (to 3' in clumps) but no standing water. Wild mint (giant hyssop) abundant among sedge clumps and in meadow bottom. Artimesia, western bull thistle also present. On the north side of the road dry open grassland with lessingia forming dense lilac fields. I collected 4 more marked adults at SE corner of large open meadow. Two were along bridal path and others near a large downed stump and log. Dry rather open grassy area. Ground squirrel burrows all around the stump — probable toad retreat. Evening clear and mild — in 70's. F. One marked adult ♂ RF 3, LF 2, —, LH 4 found near the stump. no breeze tonight. Smoke haze in Valley.

Bufo boreas

Elk Cailaton
1955

Oct. 8 Ahwahnee mdw, 4000 ft, Yosemite Valley. Brief check here with a hand lamp 8:55-9:20 P.M. along bridle path bordering NE border of meadow. Also along fence and ditch SW of the Hotel grounds. Three of us (Roberson, Hamilton, me) found no toads out. neglected to take air temp. but estimated 55-60 degrees F.

next a check of portion Stoneman meadow 9:30-9:45 P.M. Hamilton and I found no toads but heard a number of active mice in brush.

Oct. 22 Ahwahnee mdw. Anderson, Sarah & John Burns, Heinsohn, and I set out 75 snap-traps here to make partial survey of rodents. During course of making the set (9:00-10:00 P.M) I looked carefully for toads as others did. No juveniles found under logs pond A or elsewhere. Not a toad seen. Air temp. was a cold 5.8°C. a few inches above meadow grass. No standing water but vegetation slightly damp from ground fog and mist. Surface toad activity probably has ceased for this fall.

ELKarlstrom
1955

Bufo boreas

Nov. 13 1.3 mi. N, 0.2 mi. W civic Center Richmond, Contra Costa Co., Calif. Fall rains began today sometime prior to 7 A.M. and probably 1-2 inches fell during the day. Arrived Richmond site 5:30 P.M. Dark and drizzling very slightly. Water standing in puddles but none accumulated as pond water in larger depressions. One adult ♀ toad collected only - on east side of raised railroad bed. Animal slowly walking over barren ground broken by low grassy patches. Cloacal temp. 7.5°C at 5:50 P.M. Air temp. 1" above ground 7.0°C. (bulb moist?) Light breeze. Search of area about 45 minutes. Ground appears to lack a real good soaking here.

Jim Anderson out same evening NE Walnut Creek. He reported no amphibs except a couple D.O.R. *B. boreas*. Cold out there, too, with air temps 8° C.

Nov. 19? Same locality as above. Cold and rainy again. One adult ♂ found same area on east side of railroad bed. Cloacal temp. 8.3°C., air 7.9°C. 2" above ground.

Amphibians

Bufo canorus

ELKarlstrom
1955

Bufo canorus

Feb. 9 Letter dated ~~today~~ this date received from Robert L. Livezey, Sacramento State College.

Vial #56 (tadpoles)

3/4 mi. W of Carnegie Institution's cabin in Harvey Hall Natural area, at east base of Mt. Conness, 10,000 feet, Mono Co., Calif. July 30, 1952. — In a pond roughly 150 yards in irregular diameter, with much short emergent grass. Water temp. 65° F in shallow edges 1-2" and 64° F in area 6" deep.

Elbetta Pass specimens:

2.4 miles (by road) S of State Hwy. 4, 7800 feet, Alpine Co., Calif. — small artificial pond 6' x 15' not over 12" deep, supplied by seepage from east slope of upper Hermit Valley. Pond in a small wet meadow grazed by cattle. Many of the larvae taken from shallow (2-3") seepage streams above pond; also sometimes in hoof prints. Short grass & sedge in meadow and stream. (same locality as 1952 collection).

* Above Ebbetts Pass is a range extension of 16 air-line miles from Sonora Pass locality. Livezey will publish Herpetologica 1955.

ELKarlstrom

Bufo canorus

Feb. 9 Taken from Livezey's notes on *canorus*

♂, ♀ and smallest juvenile from South Highland Lake (5 mi. by road S of State Hwy. 4) from ponds at south side of lake at base of melting snow pack. Also many tads in more easterly pond, ♂ from pond directly adjacent to snow pack, ♀ from runoff pond to east but connected to snow pond (8700 feet).
Follow color notes on above from life (see notebook)

Notes on larvae not copied here. Livezey analyzed 34 *canorus* from Timberline Camp, E base of Mt. Conness. Elev. 10,200 feet.

RLL #56 $\bar{x}$ S-V 11.35 teeth 2/3 4-1
Tail 11.19
Total 22.51

Also 12 larvae from Ebbetts Pass locality, 2.4 mi. S of State Hwy 4, 7850 ft.

RLL #70 $\bar{x}$ S-V 14.7 teeth 2/3 4-1
Tail 18.66
Total 33.38

Recently metamorphosed young from same locality 15 averaged 11.63 mm. body, one had 1.5 mm. tail stub.

~~Also~~ *Bufo boreas* larvae. 16 from McKays 6½ mi E of Avery, Stanislaus Co., 4175 ft. June 7, 1952
$\bar{x}$ S-V 6.72, tail 7.47, total 14.06.

E.L. Karlstrom
1955

Bufo canorus

April 13 Hurried survey work along Glacier Point road between Chinquapin and Peregoy meadow Y.N.P. A possibly good *canorus* locality is a long meadow south 200 yards from the road below Badger Pass turnoff. The meadow is open but there may be too much gradient for standing water. About 14" of snow here, melted off at meadow margin. Peregoy has a maximum of 25" of snow, but it again has left bare, saturated ground under stand of lodgepole pine to S of road. Season appears a couple weeks ~~[illegible]~~ later this year than last.

E.L. Karlstrom
1955

Bufo canorus

May 10 Peregoy mdw, 7200 ft., Y.N.P., Mariposa Co., Calif.
9:45 P.M. Night check along road. Sky clear and star-lit. Air temp. 2" above dry road surface 4.5°C. Water temp. in surface snow run-off pool 1°C. No toads calling at several localities along road between Badger Pass and Peregoy. Left max-min. for air temp.

May 11 Returned to same locality. Bright sun, light breeze, azure blue skies. Meadow 2/3 rds snow covered but bare areas 40-50 feet wide where creek flows down meadow and also under lodgepole pines. Maximum snow depth about 18-20". Min. reading on max-min. thermometer was 29° F. for last night. I housed the thermometer in a weather station and placed at edge of lodgepole pine stand S side of road. Meadow saturated with melt water. Water temp. in melt pool 1½" deep 12.8°C. at 10:40 A.M. Air 1" above wet meadow 9.0°C. (bulb shaded) No toad activity.

~~Sat~~ May 19 2.9 road miles NE Chinquapin, 6800 ft. 9:40 A.M. Tributary of Grouse Creek. I hiked through drifted snow (to 5-6' depth but other spots clear in open areas and along creek) about 200 yards SE of Glacier Point Road. This is first big bend in road NE of Chinquapin which bends ~~it~~ in toward the slope. Small bowl-like enclosed meadow adjacent to creek. Open area 80 x 100 yards ~~bordered~~ bordered by white pine - sugar pine forest. Sheets of water 40-50 feet across in most level places to 3-4" deep, clear cold. No toads out or under

EL Karlstrom
1955

Bufo canorus

May 19 logs and slabs of bark I could turn. Area ½ shaded
10 A.M. Cast skin of Gerrhonotus found under log, too
broken up to take. Ants, centipedes, beetles under wettish
~~soggy~~ pieces of bark.
(2 mi. NE Chinquapin, 7050 ft)
3.3 road miles NE Chinquapin. Second stop here where
road makes another wide bend in toward the slope and
creek passes under road. 10:15 A.M. Canadian zone
meadow, 80-100 yards across and extending general SE
direction for over 300 yards. Meadow fairly open but
bordered by towering (to 100+ feet) red fir-sugar
pine stands bordering and at least two groves of
quaking aspen breaking it up near the central open part.
Corn lilies to 4", grass, sedges (?) scattered but
to 2" some places. Snow half gone from meadow,
remaining is 14-16" max. depth and melting fast.
Running stream, shallow, few yards wide running
NW direction, a tributary of Grouse Creek. Water
also occurs shallow sheets over much of bottom part
of meadow. I turned over extensive cover along
NE margin of meadow (see Ensatina account) but
no signs of toads. Full warm sunshine, no breeze.
Robins numerous, mt. chickadees, Audubon's warblers out.
11:20 took Kodachrome #17 facing W across meadow (Ensatina log)
11:35 A.M. Water temp. stream 13.4°C. Air 2" above meadow
(bulb shaded) 21.1°C. Algae in surface run-off at lower
end of meadow. Rana tads in silty bottomed pools in
stream.

E L Karlstrom
1955

Bufo canorus

May 19 Peregoy Mdw., 7200 ft., Y.N.P. Mariposa Co., Calif. 1:45 P.M. Max-min. (air) 17°-70° for one week. Meadow clear of snow except for timbered margins and along road. S side drying rapidly, stream flow moderate. N side with surface seeps and very boggy. Run-off streams and pools extensive, to 2-3" depth, silty bottom. Air temp. 1:50 P.M. 21°C. Water (surface pool) 22.6°C. Flow in 10" deeper channel 10.8°C. Meadow a maze of microtus burrow casts and mole upheavals.

~~Tamarack~~ Gin Flat, 7100 ft., on Tioga Pass Road Mariposa Co., California 3:30 P.M. Snow covers 3/4 (to 2') of open area here but melting fast. Large pond 80 X 20' formed on N side of road. Maximum depth 8". Hyla (few) chorusing but none seen. Probably under edge of snow banks bordering pool. Water temp 7.1°C. Air 2" above water 16.5°C. at 3:40 P.M. Robins, Sierra chickadees, 1 red-breasted nuthatch, juncos in Gin Flat area. Road to Tamarack Flat closed up by snow. I had to open fire gate above Crane Flat to get up here, but road mainly clear of snow. Conditions appear right for emergence of canorus.

E L Karlstrom
1955

Bufo canorus

June 7 Kaiser Peak meadows, 8000 ft., Fresno Co., Calif.
10:10 A.M. Males heard calling from NW base of the slope up to Kaiser Peak. Clear, warm, still day. Cloacal of one ♂ in amplexus female 24.2°C. at 10:15 A.M. ♀ ovipositing, many eggs laid (½ complement) Seepage water collected over almost entire meadow, flowing in sheets 20 yards away. Still water here 2½" deep dark brown silty bottom. Eggs covered with silt. A third adult ♂ found 6" from mating pair. Water temp. 23.8°C. 1" below surface. Eggs spread over area 25 x 10" predominantly in strings. Difficult to trace out long strings but over 2' of unbroken string followed out. Sample taken. ♀ S-V length 68 mm. ♂'s are in dark brown color phase. They match silty background very close and their calling ceases abruptly as we approach 20-30 yards from them. Triangulation with Drew Hidy only partly effective due to the ventriloquial nature of calls. Air temp. 19.8°C. at 10:50 A.M. Some high cumulus clouds.

#22 Kodachrome taken facing N where toads taken F9 at 1/50th

11:15 A.M. Batch of eggs which appear to be a full clutch found by Hidy. 5 x 20" strung out but concentrated "upstream" end. Eggs in water 2" deep at edge of broad 50' wide slowly flowing seepage stream which has max. depth of 4-5". Temp. 25.8°C. of water air near 22°C. bulb shaded. All eggs collected for counting. No adults around them. Stage of dev: uncleaved.

E L Karlstrom
1955

Bufo canorus

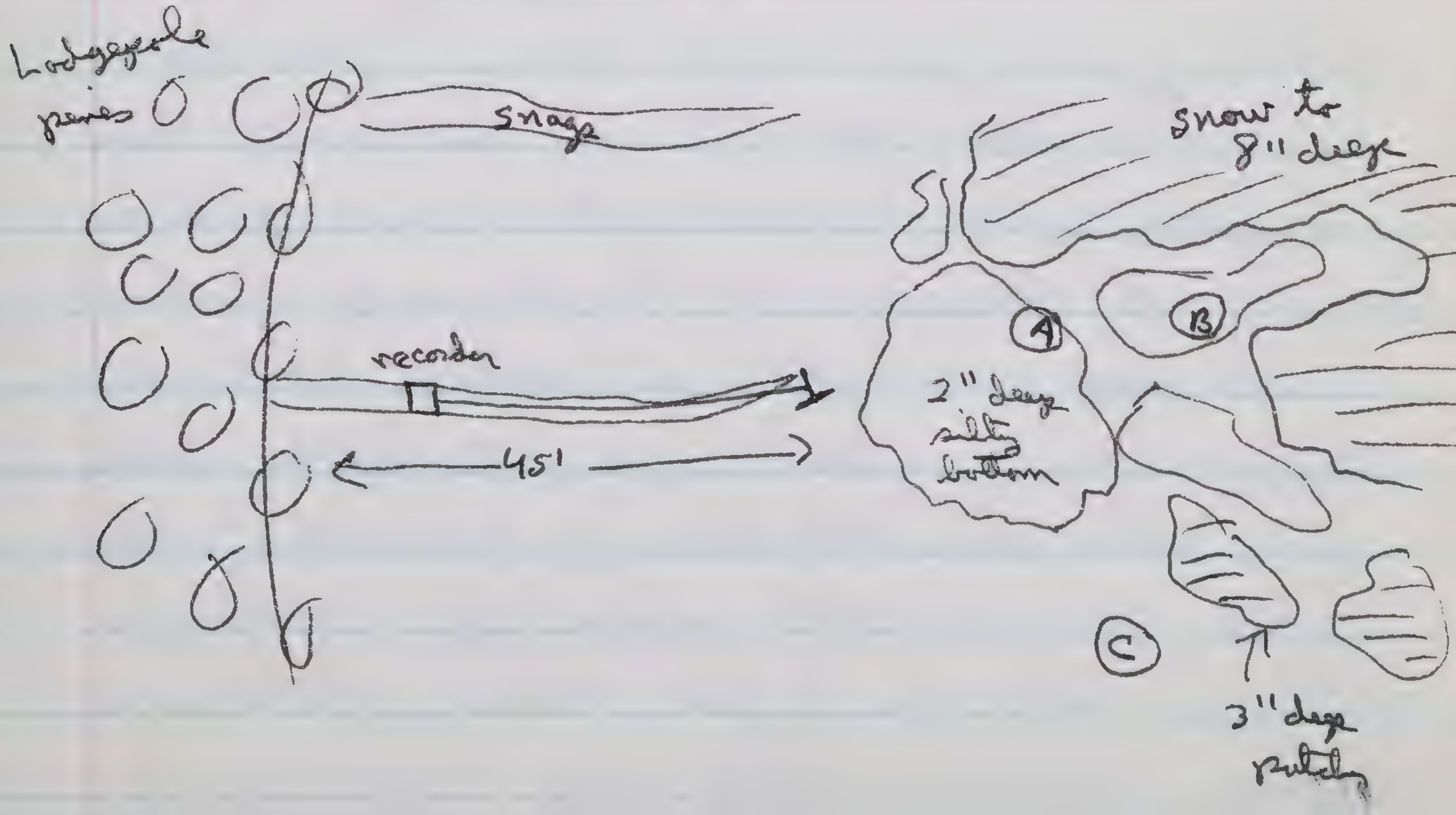
June 7 Kaiser Pass (0.2 mi. NE) meadows, 9200 ft., Fresno Co., Calif. 12:15 P.M. males trilling lustily. air temp beneath shade of lodgepole pine 22°C. air temp 1" above damp meadow margin in full sunlight 24.2°C. I set up tape recorder and mike at NW edge of meadow and left it there in hopes toads would commence calling again.

#22 Kodachrome of meadow facing due W. 1/50th F11 Voigtlander camera

#5 Plus-x facing W same as above 1/100th at F13

#6 " " WxSW 1/100th at F16.

Recording started about 1 P.M. Sky clear but for few billowy high clouds, full sunlight. Gusty breezes spring up from SW. Toads trilling nicely. mike set 45' from lodgepole pine border. mike lead runs along a long pine snag to prevent whistling.



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1955

Bufo canorus

June 7 Male (A) is 25' SW of mike, (B) 15' behind (A), and (C) over to the right. Sequence of calls imperfect but (A) usually starts out a series after a period of silence. Once the others are stimulated by (A) then they seem to have counter effect on (A) and a real chorus results. Air temp. direct sunlight 1" above soggy meadow 24.5° C. at 1:20 P.M. Water temp. where toads are ~~ta~~ 31.8 °C. Toward end of tape I sounded a high C on my pitch pipe.

Voigtlander close ups of amplexing toads which were 10' SW of mike.

#8 within couple feet of pair 1/200th at F10

#9 & 10 (pulled two) " F8 ?

#11 & 12 farther away (3-4') 1/100 th at F6.

Above pair in amplexus. ♀ and her eggs collected together.

Kaiser Pass mdws. Recording (reel No. 2) includes "release notes" of male subjected to amours of another male. Twice there were 3 males rolling like a tag wrestling team as they formed a mating "daisy chain". Movements of an adjacent male precipitates almost immediate attempt at amplexus by another. Can female color & pattern be a strong sign stimulus for sex recognition when males mount any toad that moves? From field observation I get impression that the usual stimuli: compressability, movement, lack of vocalization are operative — movement being a prime factor. What then is selective

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Bufo canorus

June 8 advantage of ♀ dichromism? Disruptive pattern? males are much harder to see with their greenish-brown color, whereas ♀s are readily spotted. One comes back to sex recognition. ???

June 14 Rock Creek Lake, 9727 ft., Inyo Co., Calif. made camp at small shallow lake just below the larger Rock Creek Lake. Marshy area adjacent to lake. No canorus active here. Water temp. 9:15 10.5°C. Air

June 15 1" above water 7.8° C. During the night the max-min. thermometer recorded a low of 33° C. At 1 P.M. Drew Lindsay picked up an active young ♀ canorus from a marshy area adjacent to creek entering Rock Creek Lake from the south. Very little wet marsh available around this lake. I took a Rana muscosa in same area as Drew found the canorus. Sunny mild afternoon with scattered high light clouds. Breeze gusty from SW. Air temp (bulb shaded) at 1:15 P.M. 17.8° C. Further search of the south end of the Lake revealed no further toads. There is a string of lakes S by SW of Rock Creek Lake and there should be good meadow habitat at the margins of these lakes. Where Drew found the single ♀ there is heavy willow growth, sedges around the muddy pools. Aspens and pine border the stream. Area tends to be open and dry. The only snow left is in form of sparse patches up under dense pine stands and north facing slopes.

Rock Creek Lake Pack Station, 9000 ft. Extensive pasture meadow here with many sink holes, rivulets & seepage streams. No canorus seen. 2:30 P.M.

E L Karlstrom
1955

Bufo canorus

June 15 Reds meadows, near Devil's Postpile, 7500 ft., Madera Co. Calif. night search of three meadow areas in vicinity of Reds mdws. 8:30-9:45 P.M. Boggy area W of Sotcher Lake. Water temp. 15.8° C. Air 8.2° C. at 8:50 P.M. Couple Hyla ♂♂'s chorusing. Hyla tadpoles, some Rana adults. Tourist meadow, about 1/4 mile N of Reds meadow Campground is most likely canorus habitat. Silty-bottomed boggy meadow pools, seepage streams. a horse pasture. Hyla tadpoles only - some near emergence. Also Govt. meadow adjacent to Campground. This meadow quite dry except for small rivulets cut deeply into meadow floor.

June 16 more extensive search for canorus above localities. Hyla tads, 2 Thamnophis taken from Tourist mdw. Also Rana. Check of Devil's Postpile meadow area and others along road on way out. Probably too early for toads. ??
200 yards NE Tioga Pass Ranger Station, 9900 ft., Mono Co. Calif. - Search of area studied last summer revealed but one ad. ♂ toad. He was in a pond located about 100 yards NE of Station. Water temp. 5:45 P.M. 15.5° C. Air 1" above pond 10.2° C. bulb shaded. According to Bob Howse, Ranger at the Entrance Station, the Pass area has only recently (last 3-4 days) cleared of snow. The meadow pools are rising fast. The meadows are now 2/3 rds cleared of snow but patches are to 4-5' depth some pockets. Pond where Tag thermograph set up tonight is 2½" deep 3 feet W of the weather housing. Pond temp. 7:35 P.M. is 10.9° C

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Bufo canorus

June 16 Tioga Pass, 9900 ft., Mono Co, Calif. –
2" below surface, air temp. 7.8° C. above wet grass. Thermograph is recording pond temp. at spot 4' out from E bank of pond 2-2½" below surface. Drew spotted an adult ♀ which eluded him in rivulet pool. We saw two other ♂♂'s while putting in temperature equipment. No eggs or calls. Canorus emergence probably recent here at the Pass.

June 24 Porcupine Flat, 8100 ft., Mariposa Co., Calif
Late afternoon check of area south of Porcupine Creek. 5:15-6:50 P.M. gentle sloping grassy hillside soggy with seepage flow from lodgepole pine forest where snow still drifted up under trees. Scattered small lodgepole pine on hillside. No toads but Rana in pools adjacent to stream.

9:15-10:05 P.M. check of meadow area. Tadpoles found up on table-like area about 100 yards S of main Creek. Hank Lippitt and I found no adults. air temp. 7.8°C at 9:35 P.M. Water 1" deep seepage stream where toads present 12.8°C. Tadpoles well dispersed but seepage flow steady and these could be result of but a few matings. Sky overcast, no breeze.

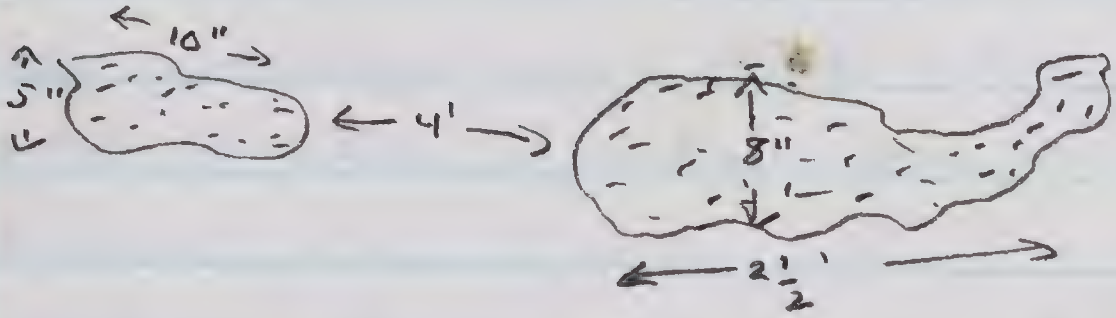
June 25 Check of same area 8:15 A.M. No signs of adults under logs or out in open. Water temp. 13.5°C. air 1" above wet bog 13.0°C. at 8:35 A.M. No additional toads found. Hank collected single Thamnophis.

ELKarlstrom

<u>Bufo canorus</u>

June 25 <u>Tioga Pass</u>, <u>½ mi SE Ranger Station</u>, <u>9800 ft</u>.
Adult ♂♂ on boggy meadow. Cloacal 14.5°C. at 10:25 A.M. Full sun but stiff SW wind and cool. Air temp 1" above boggy substrate 11.8°C. bulb shaded. Toads, young tree frogs active out on open ground. Other adult ♂♂ out, about 4-5 collected, others juveniles. One adult in small 2" deep pool, water temp. 19.5°C. at 10:55 A.M. No calling heard.

Recently hatched larvae found at margin of seepage pool 5'x20'. Some larvae still attached to jelly. Depth of water averages <1". Temp. 21.5°C. at



11:05 A.M. Pond 8" deep in middle, a steady cool 16.0°C. flow. Eggs were laid over brown silt which overlays sandy, gravelly bottom. Wound but slightly among shoots of grasses now only 1-2" tall.

Adult ♀ on boggy open meadow in full sun. Cloacal 18.1°C. at 11:15 A.M. Air bulb shaded 13.5°C. 1' above ground. Substrate (bulb <u>not</u> shaded 17.0°C.

Hank Lipsett and I tagged 11 adult and subadult toads with Co^{60} pellets 11:45-2:15 P.M. Area lies between Ranger Station NE to the large deep pond 300 yards NE of Station. Adults hard to locate. Little calling which ceases when we walk near. Clear skies, cool

Elk Andalusia
1955

Bufo canorus

June 25 but typical high winds. Top thermograph checked. Ink had dried but scratches can be read?. Toads had laid eggs practically on top of the lead extending out from the thermograph mechanism.

2:30 P.M. Eggs with hatching out larvae found in pool 40 x 50 feet, irregular, shallow, broken up by clumps of sedge. Spread over triangularly shaped area 4 feet on a side. Depth < 2½", mixed silt and grassy bottom. Group 2" below surface in deeper water at late neurula stage. Others at edge hatching out. ½°C difference water temp. two places now at 2:35 P.M. About 30% mortality on eggs. Dead adult ♀ near eggs. Side ripped open & entrails partially protruding. Looks like attack by a bird. Dead 3-4 days at least.

Reset pond thermograph at 5:20 P.M. Pond temp. 20.8° C. or 69° F. It's registering low at 64+° F. so I reset. Note size of key necessary for clock. One I brought just too small. Sample of eggs & tadpoles taken from in front of station. Water depth 1½" 4' out from station a depth of ≅ 1". Dense tadpole concentration just N of station over marginal area 3'x8'.

Total of 27 adult and subadult toads tagged with Cobalt 60 lead pellets. Toes clipped, size measured. ~~Slit~~ made dorsal surface of skin above vertebral column to prevent accidental deep cut over viscera. Pellet inserted and forced either to lateral body position or near sacrum. Eye scissors, forceps

ELK.radiation
1955

Bufo canorus

June 25 used. not a sterile technique although I put a match to scissors first time they were used & wiped tools. Most toads were collected as they ducked into the openings of ground squirrel & Microtus burrows. Peak of breeding is past. no more than 4-5 different males were heard calling, and their trills ceased abruptly as we moved into area. Yearling & older subadults out feeding during afternoon. Less than ⅓ of all adults were actually in the water.

Beckman model Beta-Gamma Geiger counter tried. We retrieved two toads known or suspected to be in area 40 x 40 feet within 5 minutes. One was submerged in silt under water 3" deep; other was almost completely hidden in a Microtus run. There is no appreciable "background" in this area. Toads injected with .015-.030 ± millicuries of Co^{60} were detectable at 5-6 feet distance. A promising technique if toads survive at least into a hibernation period!

June 26 Ebbett's Pass, 8730 ft, Alpine Co., Calif.
10:30 A.M. Small pool 10 x 30' 40 yds SE of Summit marker. Adult ♂♂ found dead in pool. Head bloody as if smashed by some kid's rock. Length > 60 mm. SU ~~toes~~ - a very large ♂♂. Fungus covered, dead many days. No signs of eggs or other adults this local area. Scattered lodgepole pine in vicinity. Snow patches up under

E L Karlstrom
1955

Bufo canorus

June 26 trees and deep on N-facing slopes. mosquito larvae in the pools. Ranunculus blooming & abundant, corn lillies to 10" but not opened. Grasses to 6-8" green. Willows just leafing out. air temp. 1" above boggy meadow 14.2°C. Sand temp 1" below surface 14.0°C. at 10:50 A.M. azure blue skies, moderate westerly wind. much human litter & disturbance this local area but snow melt pools look good for canorus breeding.

2.4 mi. S of Highway 4 on Highland Lakes road 7800 ft., Alpine Co., Calif 11:30 A.M. Tadpoles abundant in seepage pools and streams described by Bob Livezey in Feb. 9, 1955 letter to me. water temp near bottom where water 3/4" deep 21.2°C. Air temp. 17.5°C. bulb shaded, little breeze here. Sample of tads taken. Farthest developed have very small hind limbs, Caddis-fly larvae present. Bottom of seepage pools matted sedges & grasses overlain by reddish-brown loose silt. Tads scraping detritus. No visible green algal bloom. Tads in shallow water < ½" deep at temp. 27.5°C. It must get well over 30°C. late afternoon of warm day. Open meadow 100 × 75 yards with seepage flow westward from Hermit Valley. Lodgepole pine border to meadow. Some willows leafed out in boggy areas. Extensive bog available for breeding 40-50 yards square. Tads are well scattered but still results of many matings. Sedges & grasses to 10-12" height, green lush meadow. Stream about 100 yards W of here. no adults out in open, and we

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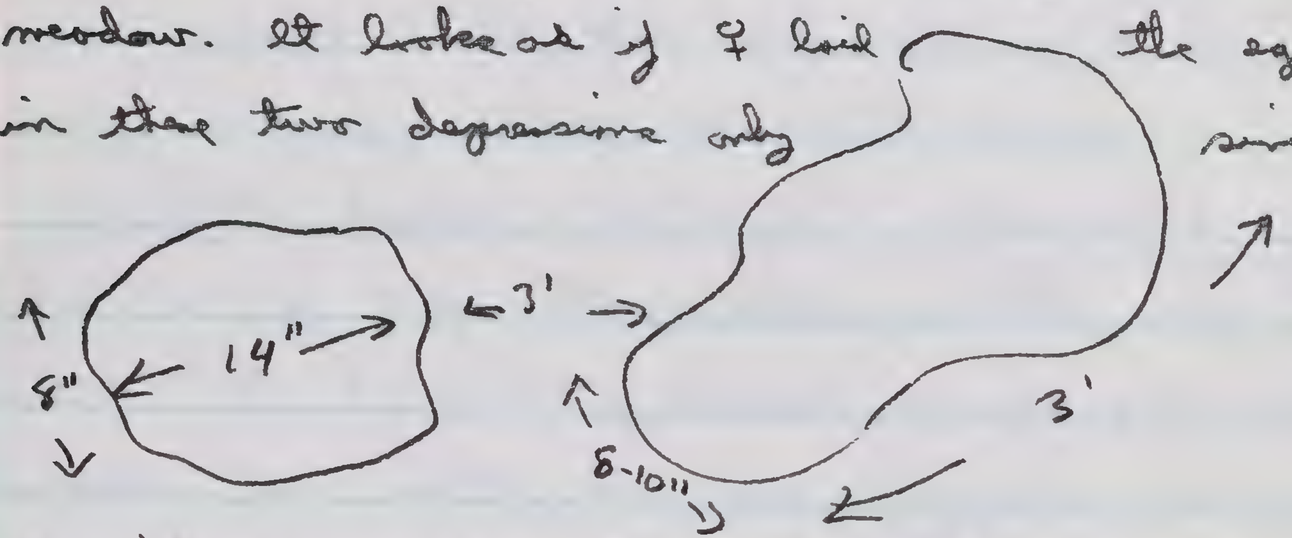
Bufo canorus

June 26 turned numerous logs and dug many rodent burrows. Breeding must have taken place about 2 weeks ago. One yearling toad collected in grass near seepage pool. Pool described by Mrs. now less than 10" deep. Some tads at margin of cold deeper end but majority in sedge filled shallow (1-2") 2/3 rds of pool.

1:50 P.M. We continued up road to Highland Lake 2½ mi S Ebbetts Pass, 8000 ft, Alpine Co., Calif.

Dense concentration of tadpoles in seepage pockets in meadow. It looks as if ♀ laid the eggs in these two depressions only



the intervening and adjacent pockets have no larvae at all. Depth (max.) < 2". Temp. 2:15 P.M. 29.2°C. 1" below surface. Tadpoles total length about 12-13 mm. Seepage flow over sedge and wild onion covered ground. Willows, corn lilies abundant. Hillocks here between depressions (cattle or horses) to 6-8" high. Tads in smaller depression must number close to 1000. Larvae found at a half dozen localities in this vast (250 yds. square) meadow but no eggs. Hatched out larvae are very close in size, varying from 10-18 mm. but that range can be found in one group. Average size of those seen closer to 14 mm. which is some 4-5 mm. smaller than approxi-

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Bufo canorus

June 26 note mean size of those 2.4 miles S of Route 4.

Dramatic effect of algae grazing noted here. A heavy 1/4" to 1/2" mat of green (lt.-gr.?) filamentous algae covers seepage area 8'x20'. Average water depth 3/4". Two concentrations of feeding tads at one corner have completely grazed off the algae over areas 3'x1' and 2'x2'. In addition small pockets of tads have formed open holes in the algal mat. Water temp. 1/2" below surface 27.8° C. here where tads congregated. 2:42 P.M. Air temp. bulb shaded 11.5° C. 1" above wet bog. Moderate winds, almost totally clear sky. Yearling toads collected among semi-dry sedges. No adults taken.

Highland Lake, 8500 ft., Alpine Co., Calif.

NE end of Lake along stream outlet. Air temp. 15.2° C. 3:15 P.M. Excellent seepage pools and streams from easterly slope and Lake area. No eggs or tadpoles as yet. About a dozen (2 ♀) adults collected mostly among willow clumps near the stream. Yearling toads very abundant. Sample taken and preserved. Ad. ♂ in willow clump charcoal temp. 23.1° C. at 3:40 P.M. No males taken in pools. This is open country with apparently shallow soil. Scattered lodgepole and white-bark pine are bent ~~with~~ from strong prevailing SW and W winds. Toads occupying open meadow area but mostly gentle slopes to NE.

Hank Lipsett's notes

Ernie — 1 July 1955

ERNIE —

WED.

No sign of the Yosemite Toad — other than the tadpoles — at Porkypine Flat between the hours of 10 AM–2 PM and 6:30 PM–9 PM on Wednesday. The weather was cloudy & looked like rain. Caught a "water snake" and some yellow-legged frogs (2) which later escaped via the untied top of my bag.

Thamnophis

THURS.

No sign of the Yosemite Toad at Tamarack Flat & on Tamarack Creek up to the highway (going to the Tuolumne meadows). Plenty of good looking toad area, however. There are two bogs — meadows — that look particularly favorable on the trail between Tamarack Flat and Hetch-Hetchy (on the south side of the road). One bog is 100 yds. S. on the trail (S. of the road) and the other is a quarter of a mile S. on the trail. Saw another "water snake" in the 2nd bog, and caught these 3 poor yellow-legged creatures in the 2 bogs. The whole creek looks good — for fishing as well as for toads.

~~Caw~~ Saw a clutch of 5 eggs of the Sierra Junco — on the ground. Noticed a junco flying at some object on the ground, and investigated. It was this snake gorging himself on a fledgling (looked as tho it had just hatched — no feathers,

1.5 inches long.) The whole operation from head of bird in mouth to disappearance of bird in snake's mouth took 6 minutes. This was at the sign "Porcupine Flat."

Thanks for everything, Ernie. I feel that I've learned things that will broaden my outlook considerably. I doubt if I will become a herpetologist, but I might at least be on speaking terms - intelligent - with the next one I get a ride with.

Hank Lipseth

ERNIE KARLSTROM

E L Karlstrom
1955

Bufo canorus

June 29
~~July 1~~ Porcupine Flat, 8100 ft, Mariposa Co., Calif. Hank Lippsett remained in this area from Tuesday July 29 to Friday July 1 and made systematic searches for more toads. His note to me states that he found no signs of adult toads at Porcupine Flat Wed. 10 AM - 2 PM, 6:30 PM - 9 PM. Weather cloudy and looked like rain. He caught a "water snake" (Thamnophis) and 2 yellow-legged frogs.

June 30 "No sign of Yosemite toad at Tamarack Flat or Tamarack Creek up to the highway. Plenty of good-looking toad area, however. There are two bogs - meadows - that look particularly favorable on the trail between Tamarack Flat and Hetch-Hetchy (south side of road) one bog 100 yds. S on the trail (S. of road) and another 1/4 mile S on the same trail. Yellow-legged frogs and one water snake collected. Whole creek looks good for fishing as well as for toads.

Saw a clutch of 5 eggs of Sierra junco on the ground, etc....." (see original sheet)

I am confident there are probably no breeding toads in Tamarack Flat area or Hank would have found the larvae. My search last summer yielded no evidence for canorus there. I still have yet to find the species below 7000 feet in the Sierra.

E L Karlstrom
1955

Bufo canorus

June 28 Tioga Pass area, Mono Co., Calif. 10:45 A.M. Trial recovery with geiger counter. One marked toad gotten (RF2) in pocket gopher burrow 20' N of rock in area where first group of toads marked (T1-T6?). Picked up first at 5 foot distance within 5 minutes of searching. Cloacal 17.6°C. at 10:55 A.M. Substrate in 3" deep burrow 11.5°C. This toad probably had been active on surface. Air temp. bulb unshaded 19.8° C. Second toad recovered 3 minutes later 30' N&NE same rock. ad. ♀ (LF4 RH4?) RH4 may be naturally missing. A wonderful method! Geiger tube used at 0.2 mr range for initial location from distance 4-5 feet. Switched to 2.0 mr range for closeup. Toad actually followed as it moved 3-4" below sod among a system of pocket gopher (and Microtus?) tunnels. Trapped her between two openings. Cloacal temp 13.5° C. Burrow temp same.

(RF2, LF2) on surface. Incision almost healed shut. 20 yds. E of rock. Worked area 10:45-12 noon but only upper 1/5 th of total study area and concentrated 100± yards NE Entrance Station where T1-7 marked. Tracerlab only instrument used.

July 8 Same locality. I began systematic coverage of area about 100 yards NE Station at 8:40 A.M. I spotted an unmarked ♂ with head just protruding from Thomomys burrow within 10 minutes of searching. It was unmarked but a concealed ♂ (RF2) 20" away was detected strongly with Tracerlab meter I'm using today. Scale was 0.2 m/hr and meter flashed up to

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1955

Bufo canorus

July 8 1.6 mR/Hr. Directly over (3" above) toad I got 2.4 mr/hr. Cloacal temp. unmarked toad was 9.2°C. at 8:50 A.M. Burrow temp. 8.6°C. Air temp. bulb shaded 13.8°C. 1" above opening. marked toad colder at 8.7°C. Burrow opening 2" across and it communicates with other tunnel. These toads may have recently come up to surface prior to daily emergence. So far no toads observed out on grass or in water. Grass surface temp. in sunlight 15-18°C, pond temp. 1" below surface where 3" deep (pond 10 x 8') 10.4°C. at 9:10 A.M. I marked the gopher runway site midway between two openings by placing an upright stick (marked A) there. Will tag one later. 9:35 A.M. First sign of emerged toads, a ♂ cloacal 11.5°C. 4' E of rock (R). Others picked up from concealed positions by geiger tube. mosquitoes out and voracious since 8:45 A.M. Ice on surface of ponds near N facing slopes when I arrived and light breeze. By 9:30 A.M. the staggered stunted Tioga wind began to whistle.

10:45 A.M.
Kodachromes #3 & #4 facing NE across area where most toads marked to date F9 at 1/50th. Taken from 40' ridge above meadow. Tioga Lake background of #3. #4 more toward E down the draw.

4x5 Voigtlander camera # 6 shot from 20' up on same shoulder facing NE x E across meadow.

#7 & 8 closeups of canorus summer retreat near rock (R) Thomomys & Microtus runs in a hillock 14" tall

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1955

Bufo canorus

July 8 and 3' x 4' across. Puddles adjacent are to 4" deep and 2-4 across. ♂ found 8' away in puddle placed in hole for shot in best nature faking fashion. F 11 at 1/100th
#5 Kodachrome an attempt at color change of above from 3½ feet. F8 at 1/50th. Toad moved. #6 at 3 feet same shot.

Toads active on surface 11:15 A.M. ♀ at stick B appears to have left burrow.

#10 Plus-X Voigtlander shot of geyser water set above site where toad concealed in gopher run. Toad 3" below pickup. F11 at 1/100th.

I tagged 6 more adult toads in upper meadow area (#28-33). Check of weather station 12:15 P.M. clock seems to have run since Jun 26th since it registers 11 A.M. Friday as of now. Temperature reading is accurate to 1° F. Pond A is lower. Depth 3-4' out from station is 1¼". Tadpoles are large and dispersed. Air temp. 16.5° C. bulb shaded at 12:40 P.M. High winds continue but clear skies except for a few light high cumulus clouds. Little green algae visible in pond. Tads are detritus feeding off plants and silty bottom. Silt is a tan color here, and the black larvae stand out sharply. Sedges in pond A are to 12" height regularly spaced few inches apart. Rest of meadow appears half green. Willows show about ⅓-½ full development of leaves. Snow patches visible 40 yards NE x E station still 20 x 60' and to 16" deep. No other snow in meadow area, but good-

ELKarlstrom
1955

Bufo canorus

July 8 Tioga Pass, 9920 ft., Mono Co.
sized patches on lower Dora slope. 2 P.M. I made a quick check of Dora meadows about 1/4 mile S south of Ranger Station. Tadpoles present this area near same stage or smaller than those at pond A in study area. max. water temp. where tads present was 28.2° C. cloacal temp. of one ad. ♀ toad in 6-8" grass was 22.4° C. at 2:20 P.M. adults and juveniles collected.

The toads I recovered today showed all good signs of physical vigor, and the dorsal incisions had closed up - apparently healing over in good shape. The lead tablets were retained either on the dorsal or dorso-lateral part of the toad's body.

July 19 Tioga Pass locality. 70% of sky cloud-covered of light strato-cumulus type at 11:00 A.M. air temp. 23.5° C. bulb shaded. Toads out and active, about 20 tagged Co^{60} tablets. Five ♀ found near Pond A. Again adult ♀'s become exposed after breeding season as last year. Pond A weather station checked. Depth 4" out from station ~1[illegible]" above silt bottom. Pond dry 2' out from station. max. pond depth 5" middle. Definite zoning of *Hyla* and *Bufo* tads with *Hyla* out deeper water but active near surface, and *Bufo* shallower margins. Sedges to 15", meadow half greened out. Still seepage flow but pools drying.

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1955

<u>Bufo canorus</u>

July 20 Ebbetts Pass Area, Alpine Co, Calif. Paul Elkins and I made a hurried check of breeding locality and eggs at Highland Lake. Adults, juveniles and larvae taken.

July 27 Tioga Pass weather station, 200 yds. NE Ranger Stat. No adults seen on surface between station and here at pond A. A cooler morning although sky perfectly clear. Moderate to light gusty breeze 9:15 A.M. Changed chart on thermograph. Mechanism working perfectly. Water temp. quick recording thermometer 11.2°C. at 9:25 A.M. Thermograph reads 53° F or within 1° ± C. Air temp. bulb shaded 12.1° C. Surface temp. of grass in sun 14.0°C. 1" of water where thermograph lead is laid in silt. about 4' out from housing. Sedges green to 16" pond A. Whole meadow area entirely free of snow and almost entirely green this area. No mosquitoes bothering me this period of morning. Sample of tads taken pond A both alive and preserved. Tads now at edges of pond within 4-5' of margin

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1955

Bufo canorus

July 27 where water depth generally < 2". Ecological separation to a degree of Hyla out deeper middle waters. max. depth about 5". Tads are late HL to emergent stage. Reduced in number to about 1/4 (?) of original toad population. Tads mostly inactive - not feeding. see Aug.? notes.

Aug. 2 Tioga Pass study area. Changed thermograph chart 8:35 A.M. Water depth 3-4' out from station housing still about 3/4 - 1" above bottom silt but pond level down to 4" maximum middle. Tad sample collected. Tads inactive at 11-12° C. water. Adults just emerged on surface. A quick look but only two seen. One had body temp. 18.5° C. Air temp. 8:50 A.M. 19.5° C. Warm, quite still morning. About 75 yards NE of Ranger Station I saw one adult in opening of a ground squirrel tunnel. It retracted, and I couldn't dig it out by hand. No snow left the last patch to melt at this locality for 2 weeks. Ground dry. The toads are still occupying upper drier areas for nightly retreat. I need the Geiger counter.

Saddle trip back into Vogelsang High Sierra Camp with Charlie Gilmore and his wife Virginia. Left Tuolumne Park Station 9:45 A.M. Arrived Vogelsang at 12:10 P.M. Hot day but cooler with up at head of Tuolumne Pass. From Fletcher Lake I hiked back up to highest of string of lakes NW of Parsons Peak. Elevation here 10,500 ft. A large glacial cirque at head of canyon with steep N and NE facing slopes. Toad tadpoles found at

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Bufo canorus

Aug. 2 Upper Fletcher lakes, 10,500 ft., Mariposa Co., Calif. wet seep area at extreme end of the bowl. Hind legs have started to appear, tads good-sized. Rana tads (this year and last) very abundant in deeper pools. Bufo and Rana larvae not found together. Water temp. where Bufo present 27.6°C. Air temp. bulb shaded 22.1° C. Clouds coming over from south over 1/3 of sky by 2 P.M. High winds, possibly approaching storm. Adult toads not found. Larvae probably represent no more than 3-4 matings since in small area. Adult frogs very abundant.

Aug. 3 Bob Stebbins made brief check of Tioga Pass area today. He reports emerging toads at study pond A as well as recovery of a Co^{60} tagged toad (see RCS Aug. 3 notes).

Aug. 7 Work party at old miners cabin above the Upper Gaylor Lake, elevation 10,800 ft., Tuolumne Co. Calif. A few tadpoles seen shallow margin of west side middle Gaylor Lake 6:50 A.M. No signs of adult toads active in area. Check of the upper (Granite) Glacier Lake, 10,700 ft. made July 27 revealed a couple separate batches of larvae at ponds adjacent to Lake. These were in hind leg developmental stage, possibly several weeks behind Tioga Pass larvae. Again no toads found. Small lakes (or ponds) on crest above Upper Gaylor were barren of anuran life. Elevation here over 11,000 feet. Open, exposed areas.

Stebbins, R. 1955

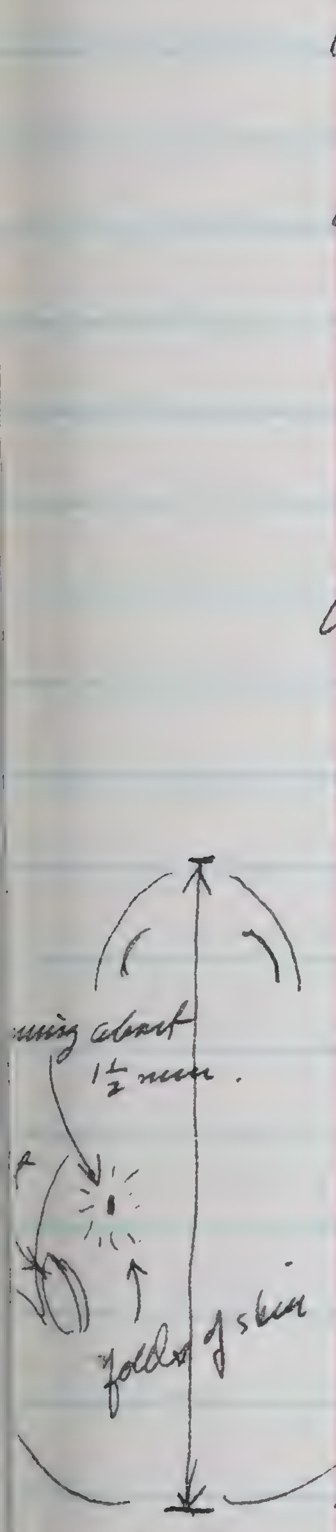
Taken for E.L. Karlstrom

Bufo canorus

200 yds ENE Tioga Checking Station, Yosemite Nat'l. Park, Mariposa Co., Calif.

Aug. 3 Water of pond at weather station 27.7°C (at depth of ½"); muck of bottom same temp.; time 12:30 p.m. Air ½" above black soil in sun (bulb shaded), 25.5°C; soil thoroughly wet. Soil (wet), 4 ft. from pond edge 30.0°C. Male toad found 105 ft. NW weather station; 75 ft. to WNW lodge-pole clump at NE side pond area; stream 15 ft. to E; toes were clipped – rt. fore #3, left fore #2; rt. hind #4 (toes counted from inside out).

Incision on back as sketched; Small elliptical opening, purplish in color & exuding lymph upon pressure. Pellet in groin area on left side not fixed in place; could be moved short distance anteriorly (½" or so).



actual length of toad.

Many recently transformed toads next to weather station; these were about ¼" in s-v.

Wild onion; willows to 3 ft. high; sedge in pond to 6" high. Many *Bufo* & ~~*Rana*~~ *Hyla* tadpoles.

Saw about ½ doz. transformed toads other than recently metamorphosed young. Two of these were about ¾" s-v. (= yearlings ELK)

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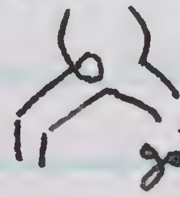
Bufo canorus

Aug. 9 Tioga Pass study area. Bob Magill of Radiation Safety Lab at Berkeley brought up a new very sensitive scintillometer (Canadian aviation Corporation) for trial on toad recovery. We surveyed the study area beginning just NE of Ranger Station at 2:15 P.M. Light breeze, balmy day, air temp. in 70's F. Toads active on surface. Three tagged animals recovered but none while underground. An animal on the surface could be detected for some 10 feet away with about 200-300 c.p.s. registered. Background was near 50 c.p.s. Bob covered the ground in an irregular manner, searching likely gopher runs first. Temp. data on T-42 (RF_ LF 2+4 RH_ LH__) 2:30 P.M. Cloacal 29.9°C. air 23.8°C. bulb shaded. Substrate just under surface 31.0°C. Animal had been hopping about on dry-appearing grass surface. Slit on back healed shut. The lead tablet located left upper femoral position



but still slips freely beneath skin. Bob got "blips" to 300 c.p.s. over a bare meadow surface. I dug out a pocket gopher run which ran downward to 7 inches below meadow surface and along a granite boulder. I was unable to unearth the rock which probably was 2 feet in depth at least and measured 14x 20" across the top. Burrow probably too narrow (<1½" some places) for a toad. We concluded the boulder radioactive. This could be a real

(But did not test "hot" Oct. 22.

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Bufo canorus

Aug. 9 drawback to our study. Bob dragged the probe about 3:30 P.M. and ended our search with the Scintillometer. Only the upper 1/5 of study area had been searched and this not very thoroughly. The crystal in the pick-up probably was dislodged, according to Magill. The meadow soil was saturated with water a few inches below the surface. Although most of meadow surface is now dry, there still remains much moisture in the soil. Recovered toads had not moved great distances. 3 more adult toads were toe-clipped (only). Weather station checked. ~~Sl~~ Still about 3/4" water 4' out from Station. Emerged toads at pond edge but still larvae in shallows. Sample collected.

Aug. 30 Tioga Pass study area. Arrived 8:45 A.M. Paul Elkins uncovered a ♂ under a 6' long piece of log. Cloacal temp. 9.2°C. Toad cold and sluggish but able to hop when released. Air temp. under log 10.0°C. bulb shaded. A second ad. ♂ found near other end of log – both 85 yds. NE of Ranger Station. ~~Three~~ Four toads tagged with heavier dose Co^{60} tablets between 8:50-9:45 A.M. (see working sheets T67-~~69~~ 70) Removed Tay water thermograph from pond A. Present water temp 10 A.M. 9.9°C. Air beside pond 13.5°C. No toad larvae left in pond but a few hundred tree-frog larvae (at the most) Sample

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Bufo canorus

Aug. 30 of emerged toads collected at edge of pond by David Wartesveldt & Paul Elkins, assistants for today. Water level same pond A. Good seepage flow continues. Sedges in pond to 16" height, fruiting structures drying out. 10:30 A.M. Two more adults marked - one with a tablet containing 3 drops stronger Co^{60} soln. (tablet 63 one side 10 other - refer to tablet data sheet). T71 marked by toe-tagging but no Co^{60} tablets left. Meadow becoming drier and brownish, but water still flowing slightly in rivulets. Purple gentian in full bloom border of pond A. A buckwheat and small composites drying out. Mammoth Peak & Kuna Crest to south has some good-sized snow (ice) patches on N-facing slope. Otherwise, the high country is mostly bare of snow, and the streams as Dana Fork are low. 18 toads marked today (T67-T84) and recovery of about four previously tagged. Geiger counter still not available for use as geiger tube in word being replaced. The toads had recently emerged this morning by 8:45 A.M. Clear sunny skies, moderate winds (for Pass area) which picked up after 9:30 A.M. Toads very active in grasses and sedges by early afternoon. Ad. ♂ at 1:15 P.M. (T84) 25 yards W weather station cloacal 26.8° C. Air 27.2° C.) tall grasses, toad hopping on surface. Favored site for adults in edge of pond among sedges if there is ready access to and away from water.

ELKoNathan
1955

Bufo canorus

Aug. 30 Tioga Pass — but not where banks are high. Escape pattern often is for toad to swim out in water, sometimes diving down to bottom like a Rana. However, Bufo does not go far out into pond as do the frogs.

2:15 P.M. check of Dana meadow about ½ mi. S of Ranger Station. Adult ♂'s and ♀'s collected. Few Hyla, many Rana larvae in ponds but no Bufo.

2:40 P.M. Brief check of a small lake on east side of road about 3-4 miles south of Ranger Station. 2 adult ♂ canorus only anurans seen except for some emerged Hyla. Toads found under logs but warm and active when handled.

Conversation with Don Mullally at Tioga Pass. He is now Curator at San Mateo Junior Museum but finishing up M.S. on pleistocene distribution at U.C.L.A. He reported finding no canorus at Tuolumne meadows this trip. Suggested California altitude record for B. boreas down ?. in southern California near San Jacinto – to over 9000 feet. This I suspected but lack the locality record. Don suggests east slope of Sierra as more likely area for sympatry canorus and boreas. This I have suspected, too, but field work yet doesn't support idea. He claims never to have found a truly diurnal boreas at any altitude – breeding behavior excepted.

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Bufo canorus

Aug. 30 Recaptured T-35 ($RF_3 LF_2 RH_4$ –) at 1:35 P.M. This ad. ♂ retaken 3 times previous. I couldn't locate the Co^{60} tablet anywhere under skin. Could be up under parotoid gland. Toad taken back to Valley for observation and testing with geiger counter when available.

Sept. 1 Re-examination of T-35 toad showed parotoid blocking view of Co^{60} tablet underneath. Tablet well imbedded up under left gland. Toad in fine shape from external appearances.

Sept. 2 ELK # 818 ad. ♂ 49.9 mm. LT 4.7 mm. x 3.0 yellow. B.O. (left.) 2.8 mm. x 2.0 mm. RT about same – not preserved.

Sept. 6 Barbara Rosenfeld of Berkeley reported canorus localities to me at Yosemite Museum. She saw ponds filled with tiny (1/4"+) very black tadpoles at Parker Pass, 11,100 ft. (11,000 or), Mono Co. Calif. I showed her preserved larvae of similar age and she seemed positive in identification. This locality is the highest breeding site I have recorded. Date was Sept. 3, 1955 which means toads could have bred here at as late as August. Snow patches remained on side slopes above the ponds, very windy here – a NE facing slope near the site. Might these toads overwinter?

Rana (?)

On Aug. 28th she observed larger larvae at ponds NE of Townsley Lake, 10,500 ft. Vogelsang area. Late emergence for these toads.

E L Karlstrom
~~Oct~~ 1955

Bufo canorus

Oct. 8 Study area NE Tioga Pass Ranger Station. Arrived here 9:10 A.M. (Pac. Std. Time) Brisk breeze at Pass but sky almost totally clear. Present reading max-min. thermometer at Entrance Station (moved from entranceway by Rafferty and Ekhart) was 48° F. Water from permanent spring seep at upper SW end of study area frozen at edges but flowing. Frost line down about 3/4" in surface sod in moist low area central part of the draw. Ground temp. 1/4" below surface (frozen dirt) 0.2°C. Saturated soil below 2" below sod surface 1.6°C. Same 8" below sod surface 3.2°C. Fresh cuts made with spade and quick-rec. thermometer thrust into sod 3/4". Three of us worked the study area 9:30-12:00 N using a scintillometer and 2 geiger counters starting at Station end of area. Results negative on toads. Several "hot spots" found various places in meadow. Jerry Robinson and I dug up one area where the soil itself registered some activity but no toads around. It seems fairly obvious that there is radioactive materials in metamorphic rocks and fragments, possibly leached out into the soil. Only 2 juvenile (young of year) tree-frogs encountered all morning - these along rivulet banks. Some surface melt of the frozen top soil by 11 A.M. under full sunlight on surface but shaded margins of still water retained surface ice. Entire meadow area golden brown. The willow leaves have turned and are dropping. Water flow from spring upper middle part of area

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1955

Bufo canorus

Oct. 8 Tioga Pass - is steady and bottom area of meadows saturated. However, in spite of this and scattered snow patches (to 20' width) on north facing slopes, the ridges are very dry. Turning over logs yielded dry sandy soil only.
- Doug Rafferty at Tioga Pass reported seeing adult canorus active in Saddlebag Canyon (leading into the Lake) last week (Sept. 30) at 9:30-10:00 A.M. None seen vicinity of Tioga Entrance Station but Doug claims he hasn't been really searching.
Continued search with counters 1:10 - 2:15 P.M. Special exploris on dry slopes surrounding Pond A. At 2:15. Bill Hamilton found a real hot spot along flowing rivulet yards W x NW of Station. Normal background on both geiger counters 0.08 mr/hr. (0.4 x 0.2 mr/hr.) Spot registered 0.2 mr/hr. or off dial set at x 0.2. We figured we had a toad but digging resulted in nothing but local gobs of "hot sod". Larger rock fragments & small boulders negative. Sad state of affairs! Second hot spot 65 yards NW of Station. Three ~~Two~~ metamorphosed juvs. found in hole up under bank. (air temp. 6°C. in hole) We dug sod out without finding adult. Again a small portion of the sod checked out hot. Sample collected. Normal background in this area 20-30 c.p.s. (Scintillometer) Hot piece of sod registered 3800-4100 c.p.s. With Tracerlab counter I got 10 ~~8~~ mr./hr. (.5 x 20) We followed out two of these blind leads, and Robinson found a third with Scintillometer. By

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1955

Bufo canorus

Oct. 8 Tioga Pass - 3 P.M. the temperature began to drop considerably and wind picked up somewhat. Air temp. 15.2°C. 3:15 P.M. 2" above dry grassy area near Pond A.

Kodachromes #7 ~~Gerald Rolen~~ Bill Hamilton the Compleat modern Herpetologist in quest of radioactive toads. #8 & #9 of Karlstrom Compleat Collector.

Voigtlander #8 and #9 Use of geiger counter along ditch.
1/100th F12 — 1/50th F9 - we goofed and used Kodachrome reading.

The sun disappeared behind ridge (above Gaylor Lakes) about 4:30 P.M. Immediate cooling effect. I checked out pond at NE x E margin of study area. No signs of toads but one juvenile *Hyla* scared up margin pond.

The only adult *canorus* found during 18 man-hours of work in study area was an adult ♂ T 71 lacking a Co^{60} tag. Jerry Robinson disturbed it at margin of ditch 1' depth and toad swam out into open. Cloacal 2:20 P.M. 10.2° C., water 1" below surface where 2" deep, moving slowly, 9.8°C. Air 13.9°C. bulb shaded. Location 51 yards W x NW of Station (weather) which means a movement of 26 yards to NW from position Aug. 30.

Maximum-min. air readings taken at Tioga Pass Station were recorded. I moved a regular wall thermometer to position near entranceway to Station. This done so a check can be made between readings near door way (possibly warmer)

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Bufo canorus

Oct. 8 and the post out on the porch. Eckhart promised to correlate the readings for me. On Sept. 23(?) the position of max-min. thermometer was changed. Unfortunately Ranger Castro placed it in sunlight. Rafferty made the switch to shaded side of post. The porch readings gotten at the Station will probably average several degrees higher than a "toad ground temperature" but general changes will correlate.

The search for tagged toads proved unsuccessful. Beckman beta-gamma counter (no ear phones), Tracerlab geiger counter, and Scintillometer all used. My hands had picked up some radioactivity apparently when I made up tags. The highly sensitive Scintillometer picked it up from me, rendering the use of the more sensitive ranges useless. Gerald Robinson used the same counter with better success in the afternoon. The "hot spots" of soil offer some difficulties but these can be followed out and the site eliminated as a toad retreat. The big question is how far and how deep the toads range in their fall movements. Another attempt with the instruments may yet yield results.

Oct. 22 Tioga Pass. Arrived 9:45 A.M. Manual sets made behind Station and along rivulet in study area. Checks made 2 geiger counters, 1 Scintillometer beginning area of pond A. Air temp. 7.8 °C. (b.s.) 2" above ground. Soil temp. 2" below surface (moist) 2.5 °C. 10:10 A.M.

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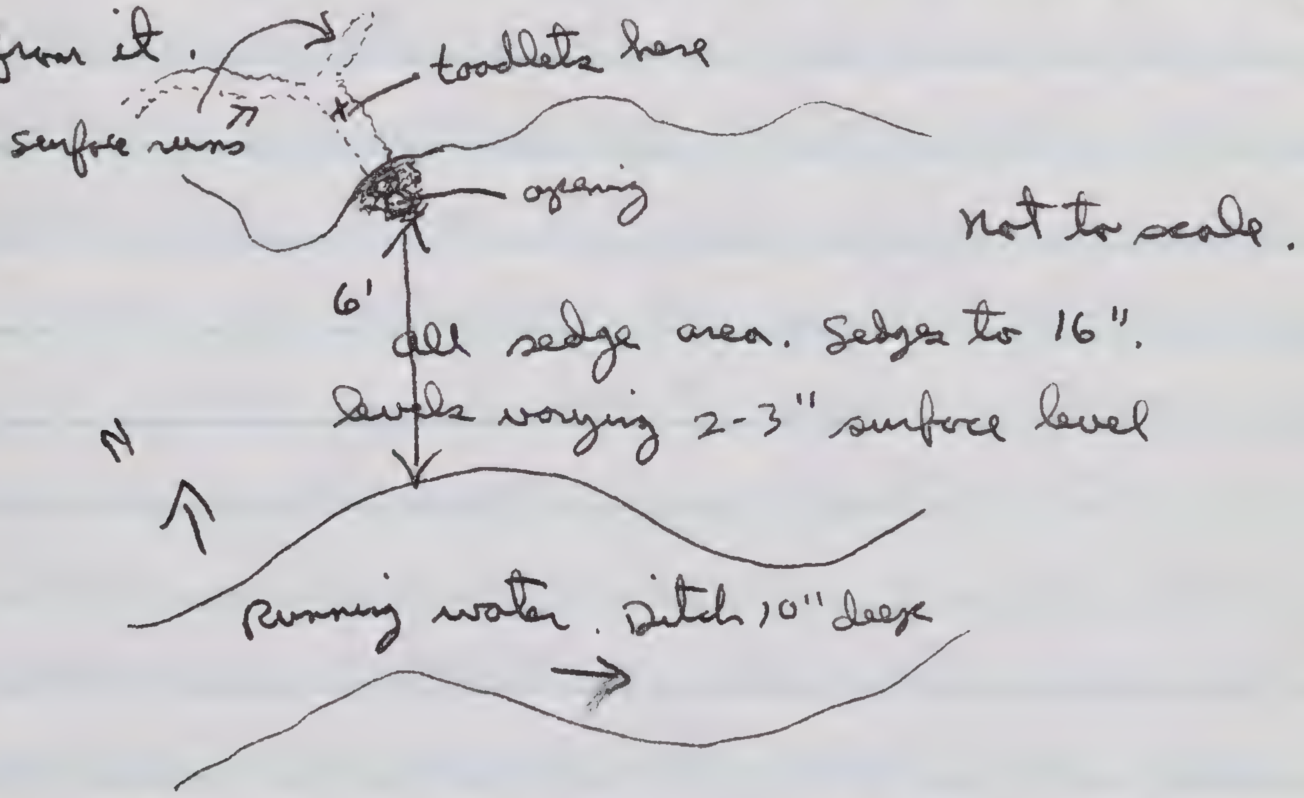
Bufo canorus

Oct. 22 Tioga Pass — 11:10 A.M. Jim Anderson got a hot spot with Tracerlab 40 yards N of tree (t). First readings about 170-180 c.p.m. but we got a maximum at a few spots near soil surface of ≅ 200 c.p.m. I got about 50 c.p.s. with Scintillometer which probably picks up the dirt radioactivity from greater area. Microtus burrow led in under shallow bank 3" below irregular grassy sod surface. Ran back about 14 inches before diverging into several surface tunnels. Young-of-year toads (3) found in the runs about 3" below surface. Animals sluggish but could move. Soil just at saturation point as water could be squeezed from it.



Air temp. in subsurface run about 2" below surface 3.2°C. Ground surface temp. (b.s.) 9.6°C. at 11:23. Warm sun has been elevating surface temp. probably for several hours but burrow temp. may be similar to minimum of last night. The juveniles may not move for three inches to several feet to find retreat. Banks of breeding rivulets and pools are

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Bufo canorus

Oct. 22 charged with rodent burrows or openings among roots. Are these permanent winter retreats for young?. If so, why shouldn't adults hibernate in similar places?. Anderson, Heinsohn, and I continued a fairly thorough search from area 40 yards N of tree X up the draw in a SW direction. A few warm spots but digging revealed either no burrow and/or no toads. The surface water is frozen on the SE side of the rivulet especially at edges of depressions (sinks) which are shaded due to a N-facing exposure. Subsurface moisture is available in this area (much resulting from snows of this past week).

Burns and the 3 of us spent 1½ hours following out what proved to be a blind lead. At about old station "C" (see original map) there is a series of metamorphic and granitic outcroppings. I first picked up a definite response between some cracked angular blocks of granite. ~~( )~~ Checked with two geiger counters and ~~wax~~. Level was ~~about ——— mr./hr~~. The hot surface could be localized to a definite center about 4-6" square or less. We began digging through the sod over a surface area of 2 x 3 feet. Each spadeful of dirt or rock was placed to one side and checked for radioactivity. The startling result was that dirt which first tested positive would test negative on re-examination. We thought we were going nuts or had an isotope with a minute half-life (not seriously!) George Heinsohn and I kept

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Bufo canorus

Oct. 22 re-testing and digging until we hit the level 16" below the surface of the meadow. Here a shovel ful of loam and root structure tested >1200 c.p.s. with Scintillometer. The hole we had dug tested definitely negative (the normal background of 30 to 40 c.p.s. ~~c.p.s.~~) The last shovel load was subdivided into 5-6 sub-samples. One small tangle of roots was "hot" - all others negative, but we could see no tablet so questioningly wondered if this was another example of selective absorption by roots of a radioactive element. Later Jim Anderson shot a mountain weasel with a 22 shot rifle, wounded it, and we began to pry up the granite slabs in groups where last tablet found. The radioactive dirt had been written off as a damnable puzzle. 3:20 P.m. I decided to try the dirt samples once more. This time I got it down to a few spoonsfull of dirt - and the radioactive slug (not numbered - probably some of first I used) was found lying on the granite boulder where the sub-samples had been laid. Soil saturated with water from point 2" below surface to 18" depth. Composition is wet loam soil tangled with roots of sedge & swamp onion to a depth of approximately 18-20". At this point we struck a large angular boulder which would be impossible to move. While struggling to capture the injured weasel we were able to peer down a good 20" by prying a large granitic to one side. It was sopping wet indicating that the water table

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Bufo canorus

Oct. 22 could not be too much lower. The running rivulet lies 25 yards S of this spot and is only about a foot below the surface here. A high water table over much of this meadow surface could limit the toads to upper levels *if* they hibernate in the meadow area. Fresh cut made edge of hole and temps. taken ~~[illegible]~~ Shultheis thermometer. 4:15 P.M.

Surface temp. 6.1° C.

-2" 8.6°C. ———— "soil line"

-4" 4.2°C.

-6" 5.5°C

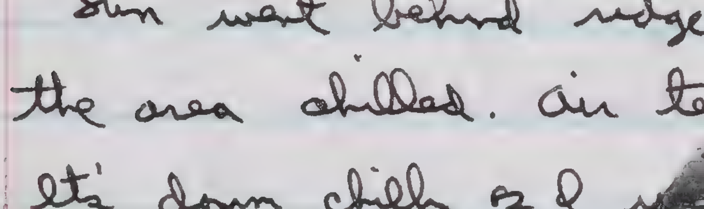
-12" 5.5°C.

-16" 5.6°C.

Sun went behind ridge at 3:55 P.M. Immediately the area chilled. Air temp. at 4:16 P.M. 3.8°C. It's darn chilly as I write this!!

4:30 Greater ~~hot~~ spot found 4 feet N x NE of first. Highest surface count 558 c.p.s. This accounts for original 2 hot spots I got earlier today.

Quit writing at above point and ~~proceeded~~ began digging with pick and shovel at edge of the warm spot. — tested high here.



I was only able to dig down through root and soil about 8 inches before encountering the surface of the down-sloping large granite

[illegible]

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Bufo canorus

Oct. 22 rock (B). Continued testing of all material dug up showed negative response with Scintillometer. However, the high count (>550 c.p.s.) stayed above the V-shaped cleft formed by rocks A and B. Four of us had previously tried to lift rock A out without success. We did move it enough to peer under one edge when looking for the least weasel. My guess is that the toad and/or pellet are below the edge of very large rock B. It was impossible to dig farther in this local area. The extent in depth of rock B unknown.

Weasels, *microtus* (nest materials found under one 4 foot square granite slab) and other rodents probably have made tunnels and runways under this pile of granitic slabs. These and shrinkage places where the soil would pull away from the rock would offer good toad retreats. There were no burrows or such where the Co^{60} slug was dug up, but rock fragments were present. I suspect *Bufo* may do considerably more actual digging and enlarging of holes than commonly thought. It is hard to account for the slug being in such compact sod-root tangle on any other basis. But why pellet only found? There was no sign of a dead toad, skin, etc. It seems unlikely that any predator carried the slug there.

Amphibians

miscellaneous

E L Karlstrom
1955

Batrachoseps attenuatus

June 9 Summit Mdw, 8100 ft., King's Canyon Nat'l. Park, Fresno Co., Calif. Highest part of the meadow to left (NW) side of trail from Horse Corral meadow. 10:15 A.M. While turning logs at margin of meadow I found a single adult inside a rotted lodgepole pine (?) log 4' x 14". Area here in deep shade from tall canopy of mixed lodgepole pine and red fir. Pieces of rotted log lie in damp duff of rotted wood pine & fir needles and some soil. Temp. where salamander lay 10.2° C. at 10:20 A.M. Air temp. 1" above damp duff 18.4°C. (deep shade). A boggy Canadian zone meadow 75-100 yards wide, 300-400 yards long irregular in shape but extending roughly N + S by my compass. A small rivulet flows courses thru the meadow, ramifying in many places. *Hyla* adults taken. *Rana muscosa* adults and yearling tadpoles abundant. No signs of *Bufo* toads although Horse Corral meadows 2½ mi. SE of here has Calif. toads in it. Sedges and grasses to 15" height. Also some *Juncus* which like sedges have heads developed. *Ranunculus* dominant wildflower now in bloom. Lodgepole pine + fir reach max. height 80-100 ft. Rotted log + duff saturated so water can be squeezed out with fingers. Associated fauna: centipedes, beetle, 2 species of ants, spiders, millipedes (sample taken and preserved). Meadow clear of snow with small remnant patches up under the trees. Search out in boggy meadow and margin opposite one just searched revealed no more animals.

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1955

Hydromantes brunus

Feb. 17 2 mi. S of Briceburg, 1900 feet, Mariposa Co., Calif. 9:15 A.M. Dick Russell collected first Hydro. taken this locality, thus extending known range 3 miles southward from Joe Gorman's type locality (0.7 mi. NE Briceburg). Small creek cascades down 30-40° NE facing slope here. Area has been "controlled"-burned and appears badly scarred. Interestingly enough, the Hydro must have been ranging out from the stream since it was found about 20 yards away from the boulder-strewn draw, under a rock in the burned-off area. Stebbins got one more Hydro closer to the stream edge in moist rock-to-rock situation. Air temp. here 10° C. Good seepage on slope.

Briceburg, 1500 feet, Mariposa Co., Calif. 10:15 A.M. Salamander-collecting conditions fine. Hydromantes also taken here but in numbers (total 13) along with Aneides and Batrachoseps. Found under wet cartons, boards, pieces of scrap in litter heaps, rocks. Amazingly (for Hydrom.) ~~easily~~ easy to collect. I took a pair of adults under a flat piece of tin 16" x 28", the ♂ 8 inches from the ♀. See Stebbins' notes for temperatures. Recent rains have ground area moist. Sky overcast during our collecting. One young Diadophis collected from under a board.

Base of Cathedral Rocks, 4150 feet, Y.N.P., Mariposa

E L Karlstrom
1955

Hydromantes

Feb. 17 - Co., Calif. search made here for platycephalus but no luck. Patchy snow under fir and pine on this south slope. Heavy patches at immediate base of rock faces. Ensatina taken. Plenty of seep from melting snow but no Hydros. Stebbins collected 2 April 1954 at this very site.

April 13 Briceburg, Mariposa Co., Calif. A quick check here at 5:15 P.M. Too dry for salamanders. Ground under litter is almost bone dry. We had hit it right in February.

April 26 Same locality. Recent rains have left slope soaked with moisture, although surface is drying out 2 P.M. today. However, it was damp enough under some slabs of slate for Aneides (4) & Batrachoseps. Dirt yielded water when compressed between fingers. John and Sarah Burns also were turning stones & litter. No Hydromantes during one hour search. Eumeces gilberti (2), one Diadophis also taken. Taricha trapped in cistern, alive.

A quick search along roadside about 3 miles east of Briceburg revealed nothing but a single juvenal Taricha. Cold seep water dripping off ledges to form puddles along Hwy 140. Slate rubble saturated. Conditions appear ideal for Hydromantes if to be found along road. None taken. Possibly too dry later in spring & summer.

EL Karlstrom
1955

Ensatina eschscholtzi

Feb. 17 2 mi S of Briceburg, 1500 ft, Mariposa Co., Calif. Gorman had been first to take xanthoptica here. Stebbins secured another today. Russell and Stebbins also took Hydromantes brunus here on 30-40° NE-facing slope.

Briceburg, 1500 feet, Mariposa Co., Calif. I took a single juvenal inside the opening of an old mine shaft under a small rock.

Junction S Fork Merced with Merced River 1600 feet, Mariposa Co., Calif. Stebbins got another xanthoptica here.

Base Cathedral Rocks, 4150 feet, Y.N.P., Mariposa Co., Calif. 7 platensis collected on snow-patched S talus of Valley. Pair of juveniles.

March 19 6 miles N Rockport on Hwy 1, Mendocino Co. Calif. 3 P.M. Redwood forest, here an old slide area for timber on 50° slope. Heavy deep shade, much downed rotted logs and bark. Aneides ferreus collected in rotted wood or under bark. One adult Ensatina same situation, a second under rotting redwood bark. Juvenal Aneides ferreus and A. lugubris taken. One Ensatina had a bright blotched E. e. picta like tail; other was duller orange.

E L Karlstrom
1955

Ensatina eschscholtzi

May 19 2 mi. NE Chinquapin, 7050 ft., Y.N.P. Mariposa Co., Calif.
Adult found in rotted red fir log just under 4" thick bark. Cloacal temp. 10.2° C. at 10:31 A.M. Temp. of rotted wood 6.8° C. with bulb shoved in it. This NE side of extensive meadow is now partially shaded with about 25% of sunlight filtering through canopy of towering (150') red firs. Typical Canadian zone, fairly open meadow bordering Grouse Creek. Meadow winding, about 80-100 yards across and extending general SE direction for over 300 yards. Air temp. 2" above rotted log (bulb shaded) 13.2°C. at 10:36 A.M. Tree (about 4' thick) so rotten it is almost leveled to meadow soil. Meadow half devoid of snow. What's left is only 14-16" deep (maximum) and melting fast. Running stream 30 yards SW of this spot. Over-wintering Rana muscosa tads in it. Meadow brown, either matted grasses or bare soil shot through with mole mounds, Microtus burrow casts, all fresh. Insect life abundant soggy rotted log (moisture readily squeezed from punky wood) — centipedes, ants, beetles, millipedes.

Second adult found 10:48 A.M. 40 feet from first in deeper shaded section of log 20' from NE meadow margin. Total length of rotted log 80-100 feet. Under 3" thick slab of bark right on top of log. Decomposed wood and wood fragments saturated with moisture. Cloacal 5.4°C. 10:55 A.M. Substrate 5.1°C. Air (shaded deeply here) 2" above wet log 12.6°C. Animal sluggish but righted itself.

3rd between first two again under slab of bark. Cloacal 6.8°C. 11:10 A.M. Substrate 6.2°C. Air 13.1°C.

ELKarlstrom
1955

Ensatina eschscholtzi

May 19 2 mi NE Chinquapin, 7050 ft., Y.N.P., Mariposa Co., Calif.
– bulb shaded but 50% sunlight filtering through trees.
11:20 A.M. I took a Kodachrome shot #17
facing W across the meadow with logs yielding
salamanders in foreground. F 9 at 1/50th. noted
vegetation on way out. Some sparse new growth of
grasses (sedges?) to 2" in meadow. What appear
to be unfolding spikes of corn lily (Veratrum)
are to 4" in soggy open areas in meadow.
Quaking aspens form groves in meadow, are just
budding. Conifers include sugar pines, red fir mostly.

E L Karlstrom
1955

Taricha (torosa) sierrae

Feb. 17 2 mi. S Briceburg, 1900 feet, Mariposa Co., Calif.
D.O.R.'s and few live adults first encountered near top of Briceburg Grade. Cloacal temp. adult ♀ on damp pavement 9.1°C. at 8:45 A.M. Air temp. 2" above pavement 9.5°C. Another ♂ found in ravine 2 feet from edge of Bear Creek heading toward the creek. It's cloacal 9.20°C. Sky overcast trace of a drizzle. While searching for Hydromantes I came on a pool (40 yards W of road) 12' x 8' x 18" deep formed by cascading tributary of (Bear Creek) entering from west. Slope 30-40° facing NE. 3 adult ♂♂ taken from pool and 3 others (appeared to be ♂♂s) out of reach. Water temp. 2" below surface 7.9°C. Air temp 9:30 A.M. 10.8°C. over damp vegetation. Moss-covered tall (to 30') boulders rim upper half of pool. "Controlled" burning has blackened most of the slope on this side of the canyon but much vegetation (especially bordering creek) still persists. Vegetation toyon, buck-eye, interior live oak, pepperwood, deer brush. Hydromantes (2) collected here. Also Aneides. Gorman previously has taken Ensatina e. xanthoptica at this site.

Continuing down Hwy. 140 we counted 46 D.O.R. Taricha over 1.6 speedometer miles. Rains of last few days must account for abundance. More encountered Briceburg and up Merced Canyon but no accurate census taken.

E L Karlstrom
1954

Hyla regilla

Jan. 10 1.3 mi. N, 0.2 mi W Civic Center, Richmond Contra Costa Co., Calif. First check of this pond area along SP tracks (see Bufo notes for description of area). At 4:30 P.M. the weather overcast, cool, air temp. above damp grass 11.0 °C., water temp. 1" below surface 11.5°C. Recent rains have swollen ponds adjacent to railroad bed. Few male Hyla calling intermittently but no general chorus. No eggs seen in ponds.

Feb. 1 Night check of same locality. A raucous Hyla chorus from all ponds and smaller pools in area. Rains since Jan. 10th have increased size of ponds, probably 6" rise water level and 10+ yards more width. A half dozen egg clusters collected at one end of pond W side of N-S running tracks (just S of small manufacturing plant). One pair taken in amplexus, only 2 females collected. Eggs early cleavage. Breeding of Hyla just getting started. Cold, clear night. Air temp. 7:35 P.M. 8.2° at 2" above water. Air temp. over dry grass surface 5.8°C. Water temp. 9.8°C.

Noted curious case of a male adult Hyla "inflated" subcutaneously and actually floating on water surface (see sketch). It was helpless when rolled over on back but

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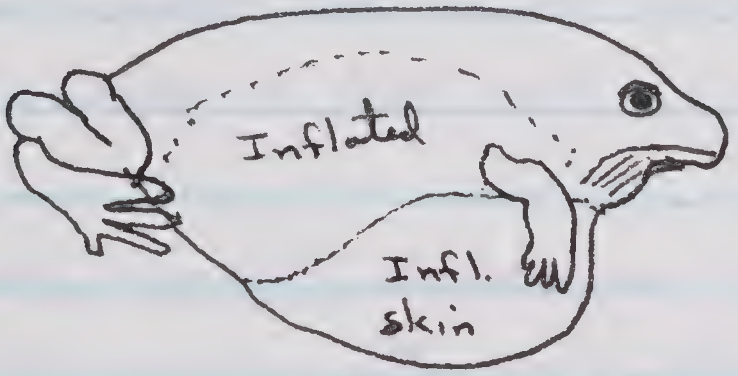
1954

Hyla regilla

Feb. 1 1.3 mi. N, 0.2 mi W Richmond civic center, Contra Costa Co., Calif
could slowly swim in normal position over surface.



side view x1

front view x1

The entire skin area is puffed out even the palms and digits. Eyes appear normal as is surface of skin generally.

Feb. 2 Kept above animal in jar overnight at cool ≅ 50° F. temperatures. ½" water in bottom of jar. Animal in same condition today. 10 A.M. I tested the inflated skin to determine whether air or fluid present. Withdrew air only from ventral region. Both air and clear watery fluid present dorsally but mostly air. Animal hopped and jumped normally but within minutes began to inflate again. Placed in cold room 10:15 A.M.

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Hyla regilla

Feb. 11 Checked Hyla collected Feb. 1 and kept in cold room. "Inflated ♂" appears normal and healthy with no sign of former condition. Jim Anderson stated that animal was still partially inflated Feb. 8 but not as much as noted Feb. 2.

Feb. 10 Richmond locality again. No Hyla chorus 2-4:30 P.M. Mild, sunny afternoon with moderate to brisk NW breeze. 3 subadult (?) males collected under a concrete slab N end of large pool. I did hear a few low "br-a-r-acks" from positions 20 yards or so from water. Additional egg clusters seen. One cluster had larvae in tail bud stage, active muscular contractions, and close to hatching. No tads free-swimming yet.

Feb 15 Same locality. Egg clusters numerous. In Pond A (see Bufo notes) I found a few recently hatched tadpoles but only at one small area of pond. Collected 8-9:30 P.M. Clear sky, moderate breeze, cool. Heavy chorus of Hyla continues.

March 23 Same locality. Hyla chorusing 8-9:15 P.M. but few egg clusters noted. Maximum size of tads from Pond A (see Bufo notes) about 25 mm. Body 10-11 mm, tail 14-15. A dead cat in Pond B (there at least two weeks) had many Hyla tads over its surface. Some may have been feeding on exposed, decomposed flesh.

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Hyla regilla

April 12 1/5 mi. S of Gov't. Center, 4000 ft., Yosemite Valley Calif. adult female collected 4:30 P.M. in wet grasses about 2 feet from a shallow pool. cloacal temp. 13.8°C., substrate the same. air temp. (bulb shaded) 2" above wet substrate was 14.2°C. The oviducts spawned out but no sign of eggs in the pool 10 x 15 feet by 2-3" deep. Deeper water lies to the west of here - toward the Superintendent's house. check later.

El Capitan meadow, 3800 feet, Yosemite Valley Calif. 5:25 P.M. The pond here is just over 1/3 the size it was last year at this time. It now measures 40 x 60 feet, is 2 feet deep in middle and heavily choked with dead and living vegetation. Hyla heard calling as I approached. Numerous egg clusters: most advanced were just hatching out but I didn't see many free-swimming tads.

April 26 Stoneman meadow and Sentinel meadow 9:30 P.M. Hyla (2 or 3) at melt stream former meadow. Many chorusing at Sentinel meadow where considerable more water exposed. Snow to 10-12 inches depth both sites. Air temp. 1" above snow -0.4° C. at 9:42 P.M. Water temp. 1" below surface where a foot deep 2.9°C. Crazy mixed-up Hyla don't know when to call it quits!

E.L. Karlstrom
1955

Hyla regilla

May 18 Yosemite Valley, Mariposa Co., Calif. Hyla choruses still strong evenings and at night in the Valley. Tads seen at Sentinel mdw, few, ~~not yet~~ reached ~~full~~ hind leg development. At Stoneman mdw 10:15 - 11:00 P.M. about ten adults, both ♂♂ and ♀ out on dirt path and among dry leaf litter. There is a scarcity of suitable breeding pools this locality. My impression is that Hyla got a late start breeding this spring due to dryness (low water table) of Valley prior to May.

May 19 Ahwahnee mdw, 4000 ft. Yosemite Valley. Dramatic example of effect of light (and temp?) on breeding ♂'s. I was working around study ponds this meadow at 5-7 P.M. Little or no chorusing until shadows descended over area at 6:15. Instantaneous chorusing of about a dozen males which either moved to stations in pond or had been set there. I listened for similar effects on any toads in vicinity but only Hyla heard. Hyla males may be found calling any time of day but usually only from concealed positions in grass or under objects.

~~Aug. 30~~

E. L. Karlstrom
1955

Rana muscosa

April 13 3 mi E x NE Chinquapin, 7500 ft., (meadow SE side road) Mariposa Co., Calif. 3 P.M. Adult frogs active in icy stream flow along margin of snow banks in meadow. They swam to bottom of pools in stream and quickly buried themselves in the mud. Water temp. (flowing) 1.9°C in one pool containing 3-4 frogs. No sign of eggs. Snow covers nearly all of open meadow, to maximum depth about 2 feet.

May 19 Same locality. Adults collected in small stream. Snow 2/3 rds off meadow. One pair in amplexus. Water temp. 6°C. at 2:15 P.M. No eggs seen. Most tried to escape by burying themselves in silt of bottom. Chose deeper pools, slower moving water.

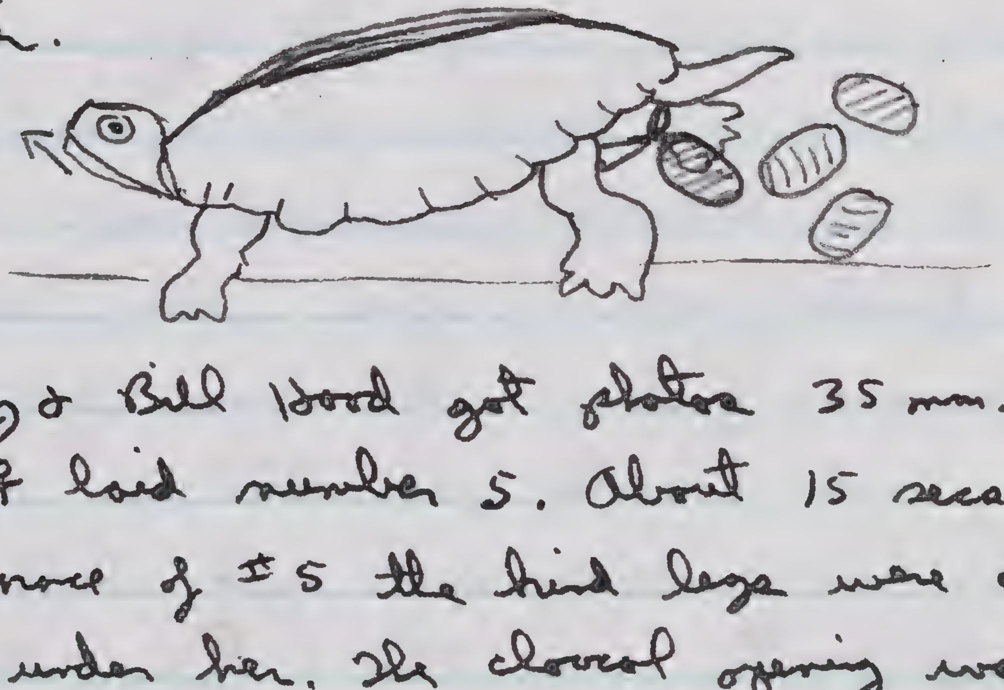
June 5 Mono Meadow, 7150 ft., Y.N.P., Mariposa Co., Calif. A dozen or so taken from stream course meandering thru the meadow. Thamnophis elegans adult found with a large frog recently swallowed. No eggs seen.

June 7 Kaiser Peak Mdws, 8000 ft, Fresno Co., Calif. 10:45 A.M. Frogs abundant, mostly in potholes or deeper stream courses. Eggs (2 clusters) in moving water 18.6° C. at 10:48 A.M. Air (bulb shaded) 19.8°C. Clusters average 2x4" oval shaped. Eggs appear uncleaved or early cleavage stages. Depth 6", flow 20" across, water moving 1 ft 2-3 seconds. Eggs collected.

Reptiles

Clemmys marmorata

July 23 Incubation data on adult ♀ captured early June by Marshall "Buck" Evans near Hetch Hetchy Dam. Turtle in aquarium out on back porch of Yosemite museum. Hank Weston saw no eggs at 8 A.M. Mary Giuntoli saw first at 8:40 A.M. Between 9:00 and 9:05 the second was laid. Fifth egg came at 9:25 A.M. 3rd & 4th about 5-10 minute intervals. There was a small amount of water in bottom of aquarium. Mary added some soil but she laid directly in the shallow (<1 cm) muddy water.



Mary & Bill Hood got photos 35 mm. with strobe as ♀ laid number 5. About 15 secs. prior to appearance of #5 the hind legs were drawn forward and under her. The cloacal opening was about 3/4" above the aquarium bottom as egg extruded. Motion of egg steady and gradual. Slow movement of tail to side did push the egg slightly, but there apparently was no attempt to manipulate eggs with her hind legs. She did not move forward or back after ovipositing. Head forward & elevated 30° during laying act. At 9:53 A.M. the tail was slowly moved away in an arc from her body

where it had been pressed for last 10-15 min.

E L Kadstrom
1955

Clemmys marmorata

July 23 9:54 A.M. — 4 slight bobbing movements of hind legs resulted in elevation tail end < 1 cm. during 6-8 second period. 4-5 mm. RH leg extended postero-lateral at 9:56 A.M. 10:01 2 more bobbing movements by raising hind legs. 10:06 Raised rear over 1 cm. by drawing legs under her. As before, forelegs kept still. 10:07 A second convulsing of whole cloacal region with plastron slightly depressed. Lateral expansion 1 cm. each side of cloacal region. Tail now almost pointing directly posterad. Hind legs symmetrically placed, tips of claws 3 cm. out from edge of carapace. 10:12 Head raised gular region depressed. Elevated on all fours, Cloaca pushed back, swells laterally. First movements were lateral rocking movements. Head raised or alternately retracted during straining movements. Egg came 10:15 A.M. while ♀ was raised a full 2+ cm. above floor of aquarium. Tail straight back and slightly elevated. more Kodachromes. She pushed tail to one side forcing egg slightly to the right and settled down with tail and hind end almost covering the egg. ♀ very active 2 min. after egg laid and tried to walk away. ♀ returned to museum porch aquarium minus her 5 eggs. A sixth laid prior to 11:35 A.M. when Mrs reported it.

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1955

Clemmys marmorata

July 24 Size of eggs as measured vernier caliper.

#	L	W
1	35.0	20.7
2	35.9	20.2
3	38.9	19.8
4	36.4	19.9
5	35.1	20.7
6	37.5	20.4
7	35.2	19.6
Total	254.0	141.3

$\bar{x}$ L = (36.28) mm.

$\bar{x}$ W = (20.19) mm.

Color an offshade white (tinged gray). Shape long oval nearly symmetrical. When held to light the yolk appears as a zonary ring > 1 cm wide situated medially. no obvious germ spot visible. Eggs are hard like a hen's egg. no give when pressure gently applied with fingers. Eggs have been in research room since 10:45 A.M yesterday where average temp about 25 °C. It is now 26-27° at 12:10 P.M. today. Eggs transferred to a cut-down bottom tin from a small aquarium. Tin 9½" long, 6½" wide, 2½" deep, oval and 25-30 nail holes punched in bottom for drainage. Eggs taken to Camp 19 for care there. A maximum-minimum thermometer kept in tank. 60 w bulb in student goose-neck desk lamp turned on about nightly and placed 8-10 inches above top of soil. Eggs just buried under soil surface. Pan removed to sunlight at irregular intervals.

Aug. 17 Check under light of all eggs. One has dark disc-like structure which moved when egg rotated. All others showed only the zonary yellowish-orange yolk with no distinct germ spot.

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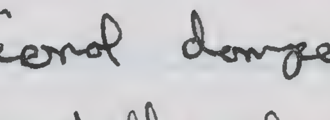
1955

Clemmys marmorata

Aug. 27 Phone conversation with "Buck" Evans at Mather District Ranger Station. He reports seeing pond turtles the size of 50¢ pieces with soft flexible shells in ponds at end of May or first part of June near Hetchy Dam, elevation about 3700 feet, Tuolumne Co., Calif. This may be a clue that the turtle eggs over-winter either after being laid in fall or female retains them ~~to~~ until early spring. Fact that Myrtle, the Fertile Turtle (female under study) laid eggs in July suggests summer or fall laying. Stebbins 1954:171 reports April-August laying for species.

Sept. ~~15~~ 11 Myrtle preserved and taken to MVZ along with the eggs which have been kept in shallow can of soil. Check of eggs by transmitted light shows no particular change. Some have good-sized air space but yolk continues to fill up about ½ the space 

Paul Anderson looked at the eggs. He felt a couple looked "possibly fertile", suggested shifting them to sand.

Oct. 27 All kept at lab temperature 20-25° C. without special care except occasional dampening of the soil or sand medium. 5 of the obviously un-developed eggs opened. All were spoiled and showed no sign of ~~even~~ a good germinal disc. Two more opaque (due to shell?) eggs kept on sand in 8" wide finger bowl. One shows

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1955

Clemmys marmorata

Oct. 27 a fairly dark area when candled. 60-W bulb in goose-neck ~~lamp~~ lamp placed a foot above the eggs 8:30 P.M.

Jan. 7 Eggs (2 remaining) finally cracked open. One with cracked shell was dried up. Other same as those previously opened. All eggs apparently were not fertilized since no sign of embryo.

Finis to this clemmys investigation!

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1955

Sceloporus occidentalis

May 18 8 mi. E Plonoda, 600 ft., Mariposa Co., Calif.

10:05 A.M. Rolling grassland fenced off for pasture both sides Hwy 140. Grassland broken up (sporadic) especially along creek course by basaltic flaky outcrops. Few (4) individuals seen, one noosed, a young ♂ showing fair territoriality. Dorsal surface of lizards seen is lighter than the gray-black lava deposits although lichen of grayish-green color covers much of the exposed rock surface. Rock surface near where lizard taken 35.2°C. at 10:08 A.M. in full sun. Air temp. 27.5° C. (bulb shaded) cloacal not gotten before lizard handled too much.

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1955

Thamnophis elegans

April 12 ½ mi. S by SW of Govt Center, Yosemite Valley Calif. Interesting case of a snake still active at quite low temperatures. While searching for Bufo boreas in ponds I encountered the eye shine of a garter snake approximately 28-30" long. It was lying motionless in the water with but anterior 3 inches raised up. Dozens of Hyla were calling in this pond and the snake likely was preying on them but no bulges appeared in its stomach region. I wonder if the vibrations from the tree-frogs' vocal sacs might not be transmitted over the water surface to the body of the snake (?) The snake remained still for 5 minutes, probably disturbed by my lamp. I purposely left the pond for about 10 minutes, my head lamp failed, and by the time I returned 20 minutes after leaving, the snake was nowhere in sight. Its only observed movements had been swimming forward a foot just after I first spotted it. Water temp. 1" below pond surface 1 foot from edge where water 4" deep at 7:50 p.m. was 14.8°C. Air temp. 1" above water surface 8.0°C. and over dry grass 7.3°C. The warmer water undoubtedly enables this form to hunt at night under such conditions. I wonder how far it traveled out of water exposed to such low air temperature.

Birds

ELKadstrom
1954-55

Bird list

Oct. 16 Western meadowlark flock 15-20 west of Plorada Mariposa Co., Calif. Fence along Hwy 140.

Lark sparrow same area (2-3)

Sparrow hawks (8) " "

Red-tail hawk 5 mi. W Mariposa

Scrub jays (6) Hwy 49 near Mt. Bullion.

California Woodpeckers same. also Yos. Valley 10/17

Fox sparrow (1) on Tioga Road 2 mi. NE Crane Flat.

Clark's nutcracker (3) Tioga Pass.

Sierra Junco (8) Siesta Lake on Tioga Pass Rd.

* Nuttals poor-will (2) on road 6:00 P.M. about 3 miles E Crane Flat Entrance Station, Yos. Natl. Park, Mariposa Co., Calif. Positive identification by red eyes and general shape. Flew off into brush when closed.

Steller's jay - Yosemite Valley

Calif. road-runner D.O.R. on Hwy 140 near Cathay.

Calif gull - Tenaya Lake

Feb. 17 1955 Dick Russell spotted two Shovellers along State Hwy 140 2 miles NE Plorada, Mariposa Co., Calif.

Hairy woodpecker - below Cathedral Rocks Yos. Valley 4150 ft.

Meadowlarks
Shrikes
Sparrow hawks, etc.
} Hwy 140 to Yosemite. In foothills

Red-tail hawk

E.L. Karlstrom
1954

Yosemite Bird List

April 24 Peregoy mdw., 7300 ft., Yosemite Nat'l. Park, Mariposa Co., Calif.

Robin (S)

Brown creeper (H)

mountain chickadee (H)

Red-shafted flicker (S)

Great gray owl (S)

April 25 Meadow 1/5 mile S Gov't. Center, Yosemite Valley, Mariposa Co., Calif.

Red-winged blackbirds (10-12) nesting here.

Virginia rail (1) seen at night

Chickadee (H)

Acorn woodpecker (2)

Steller's Jay (3)

E L Karlstrom
1955

Great Gray Owl

Oct 23. Skins of two adults had been prepared by Doug Hubbard of Yosemite museum Oct. 19 and were lying out on desk in research room. Information from Hubbard was that Marshall B "Buck" Evans, District Ranger at Mather, had found the pair (♂ and ♀) shot (with a .22 likely) and hung on a fence at Ackerson meadow. Locality is .2 mi. N x NE ~~off~~ from Big Oak Flat Road (Hwy 120) just where the highway leaves Yosemite National Park. mdw. about 5 miles N x NW of Crane Flat Entrance Station To Y.N.P. Elevation 4700 feet.

Specimens a little ripe when Doug got them but he was able to put ~~up~~ a good pair of skins for the Yosemite museum. I tried to call Evans but phone line was out to Mather Ranger Station. Sent him an office memo from museum requesting more details. This species considered an uncommon W.V. except for breeding pair spotted vicinity of Ostrander Rocks south of Valley in Y.N.P. (Grinnell and Storer 1924). I'm wondering if the pair killed could have been a resident breeding pair(?) Hubbard stated he planned a press release concerning the wanton slaying of these quite rare (for California) birds.

[illegible]

ELKarlstrom
1955

Great gray owl

A great gray owl observed in Y.N.P. Joseph S. Dixon *Condor* 46 (5): 244. Observed 7400 ft. west branch Bridalveil Creek Yosemite Natl. Park June 23, 1944. Bright sunny A.M. perched on top of < 6' high fir tree center of very wet meadow. 2 miles from locality where two owls MVZ 25534 and 25535 collected by Grinnell ~~J Stor~~ June 18, 1915.

Abbott, Clinton G.

1943. Another record of the great gray owl in California 45 (1): 37. adult from between Coarsegold and Finegold, about 3200 feet, Madera Co. May or June 1930. Shot by boys and mounted, later donated to San Diego S.N.H. 20 air line miles S of Y.N.P. measurements given.

Bryant, Harold C.

1920. Edward Gorner, a pioneer naturalist *Condor* XXII (1): 32-33 Collection records of Gorner include ♀ (two others taken about same time) Quincy, Calif. May 12, 1894. Three owls from same general locality.

Grinnell, J.

1914. The great gray owl in Calif. XVI (2): 94 Author reports two existing records 1857 "Sacramento Valley" 1890 "hills near chico", Sept. 26, 1913 6 mi. S McCloud, Siskiyou Co. Now # 24484 MVZ.

MVZ 73353 3 mi due S Mt. Ingalls, Plumas Co. Calif 6000 ft Sept 17, 1937 John Sonnenwirth

EL Karlstrom
1955

Great gray owl

Oct. 23 notes on specimens Yosemite museum.
MB Evans ♂ (Douglass Hubbard) found shot and hung on fence. 1 lb 13 3/4 oz. Oct. 19, 1955
Total length of skin 23 3/4", beak-vent ≅ 10 1/2".
Tarsus 2 1/2".
MB Evans ♀ same. 1 lb 9 1/2 oz. 24" ~~total~~, beak-vent 10 1/4", tarsus 2 1/2".

Mammals

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1955

Ursus americanus

May 18 Ahwahnee meadow W of Camp 7, 4000 ft., Yosemite Valley, Y.N.P., Mariposa Co., Calif. 5:45 P.M.
A ♀ and two young cubs in stand of mixed yellow pine and incense cedar at border of south side meadow. I didn't see them until I heard a series of guttural exhalations and looked up to see the ♀ and young 50-60 yards away. The ♀ "ordered" young up a pine tree (I couldn't hear any sound but she appeared to motion with her head and they immediately responded) and then advanced about 4-5 yards in my direction, giving a few more suppressed growls. I backed up obligingly and observed from a position 75 yards away. The cubs went 30' up the 4-5' thick trunk of the pine. They apparently tired in about 5-8 minutes and backed down together.

♀ medium-sized, dark reddish brown. The cubs identical in color but lighter brown than female. Young about size of small cocker spaniel. The playful activity of cubs continued after they came down tree. They seemed to climb 5-10' up trunks in sheer play. ♀ was near base of tree and ~~twice~~ the cubs would swing from trunk to mother's back. One rode like a bare-back rider for a minute or so. The ♀ took 2-3 steps and the cub rolled off hitting feet first. One playfully boxed its mother. ♀ remained placid. Cubs wrestled each other like kittens at one time, repeatedly climbed tree trunks usually right together. Cubs never more than 20-25 feet from ♀.

Field Notes 1955

Tape Recording Data

E L Karlstrom
1955

Recording Data

Magnemite Portable tape recorder loaned by Moses Asch, Folkways Records, N.Y.

June 7 Huntington Lake (Deer Creek Campground), 6950 ft. Fresno Co., Calif. Reel No. 1 About 400 feet of bird calls. Lodgepole pine grove on north side of Lake. Also Red fir, Jeffrey pine. 5:40 - 6:20 A.M. Temp. cool 8-10°C. Western robins first wakened me about 3:45 A.M. Males singing from 40-60 feet up in pines. Full moon probably initiated early morning activity. Western wood pewee, mt. chickadee also recorded in background but robins predominant.

June 8 0.2 miles NE Kaiser Pass Summit, 9200 ft., Fresno Co., Calif Reel No. 2 Almost full reel of the Yosemite toad Bufo canorus recorded 1-2 P.M. 3-4 male toads involved (see field notes). Full trill of males; also the "release notes" of males as another male attempted amplexus. SW breeze but sunny and warm 24-25°C. Hyla regilla background. Reel No. 3

June 11 Kaweah Campground at Giant Forest, 7000? ft., Sequoia National Park, Tulare Co., Calif. 5:30 A.M. An attempt to record anguished grunts of 350 lb. female bear (Ursus americanus - American black bear) which we forced up into a white fir. She clung there for nearly an hour before we let her down. Her toll during the night: 4 caches of food, one car window broken out completely, one mutilated iron food locker, hours of lost sleep. Note campers' remarks, bear sliding hurriedly down tree trunk and heading for other parts. Later we discovered her 2 cubs 50 feet up in another tree - and felt happy we didn't

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1955

Recording data (2)

June 11 get retaliation for our efforts to scare her off during the night. She had been within feet of our sleeping bags during the night. About 100 feet of tape recorded. Maybe she growled because of a gut-ache after her "snack" of flour, bread, oleo, peanut butter, marshmallows, coffee cake, canned meat (cans simply ripped open with her teeth and claws), jam, sugar, cereal - etc. etc. Hope she got her nose burned after tipping over my jar of formaldehyde!

June 13 Finish [~~reel~~ No. 3] Deep Springs Valley, 3920 ft. Inyo Co., Calif. Recorded 7:15 - 9:00 P.M. intermittently. This is a marshy spring in an isolated valley near the east-central border of the state. Red-wing blackbirds and yellow-headed blackbirds nesting apparently side by side in the sedges of the marsh. Single "chuck" notes are mostly from ♀ red-wings; the harsh trills of the ♂s. The yellow-headed ♂ blackbirds have a harsher call. The most prominent series of this species were from a single ♂ perched 5' above the marsh on a fence post. He was apparently putting on a mating display. At least a ♂ red-wing 4 feet away wasn't intimidated by his antics if they were territoriality behavior. Texas nighthawks (10-12) feeding by 8 P.M.

[Reel No. 4] more Deep Springs. There are a few Bufo (boreas) exsul notes along with a few Scaphiopus. By 8:30 P.M. there were no more toad notes although a single spadefoot toad kept calling from middle of marsh.

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1955

Recording notes (3)

June 14 Finished all but about last 100 feet of reel 4 tonight 8:00-8:30 P.M. Campground at lower end of Rock Creek Lake, 9700 ft, Mono Co., Calif. A male California purple finch about 30-40 feet up in a lodgepole pine set up a stirring concert. The cascading Rock Creek as it tumbles out of Rock Creek Lake is the roar in the background. It's cold, 6°C. Robins, Sierra juncos, a few white-crowned sparrows have been heard in the area.

June 15 Last 100 feet of reel 4 at Reds Meadow Campground, 7500 ft., near Devil's Postpile Natl. Monument, ~~Mono~~ Madera Co., Calif. About 8:00-8:30 P.M. Lodgepole pine forest. Small creek nearby; some breeze thru tops of pines. Picked up Oregon junco mostly but robins, white crowned sparrows, cow-birds in local area.

June 16 Reel 5 recorded same locality 7:30-8:30 A.M. Robins, white-crowned sparrows, juncos, chickadees, western tanager, hairy? woodpecker, purple finches, cow-birds all in the area. High-pitched shrill notes are of the "picket-pin" (ground squirrel) 3 of which were standing erect by their burrows out in the meadow. Breezy this morning, cool after slight hail and rain showers of last night.

~~Reel No. 6 Purple finch, hairy woodpecker mostly. Thought I heard a mountain quail sound off twice. Recorded 8:30-9:15 A.M. Sunny, warmer but windy. Lodgepole, Jeffrey pine hillside.~~

ELKarlstrom
1955

Recording notes (3)

~~no recording reel no. 6.~~
~~I must have goofed and had switch~~
~~on "play" position.~~

June 16 [Reel no. 7] 300 feet Reds meadow. Hairy woodpecker in hollow pine snag. Some mountain chickadee, finch.

June 27 Faith Valley, 7500 ft., Alpine Co., Calif. Last 300 feet [reel no. 7] recorded 7:30-8:30 A.M. Open range cattle, red-winged blackbird far out in meadow. White-crowned sparrow, purple finch.

[Reel 8]
July 8 Camp 19, 4000 ft., Yosemite Valley, California. Paul Elkins caught a mole Scapanus latimanus sericatus (Yosemite mole) which we placed in a glass aquarium. The angry grating notes of the mole when prodded were put on tape. When released it took the mole but 35 seconds to burrow underground in relatively hard-packed open ground.

July 10 5:30-7:00 A.M. Bird calls recorded west of Govt. Center near base of Yosemite Falls which can be heard as roar on tape. No wind. Western wood pewee, steller jays, acorn (or Calif.) woodpeckers, robins, flickers are in area. Most were from fledgling acorn woodpeckers 30 feet up in a black oak tree as they squawked for food. The first bird calls after the mole are mostly of black-headed grosbeak near Sentinel Bridge 5:45 A.M. This terminates with sound of omnipresent automobiles in Valley. Clear

ELKarlstrom
1955

Recording data (4)

Reel No. 8

July 10 mild morning typical of Valley midsummer mornings. I dubbed in some remarks at end of tape using the Yosemite museum Pentron recorder. note following portions of my voice using magnemite in field. In replaying tapes I've been aware of the treble pitch my voice comes out as. The animal recordings may all be too treble, too.

Reel No. 9 About 50 more feet of tape of fledgling acorn woodpeckers. Follows brief series of Steller jay notes at Camp 19, Yosemite Valley. 9:30 A.M. Sierra ground squirrel (Citellus beecheyi sierrae) in rock talus slope behind tents recorded as he perched on large granite boulder and "piped" his shrill notes. Raucous notes of Steller jay follow, note whistles, chatter, etc. of versatile jays.

July 20? Reel No. 10 Experimental recording of the "release" notes of male toads: Bufo (boreas) exsul, B. boreas halophilus and B. canorus. Recorded at museum both on magnemite and Pentron machines. Toads held between fingers behind forelimbs to get the notes.

ELKarlstrom
1955

Bufo sp. recording data

July 25 Experimental recording at museum, Yosemite Valley of the male "release notes" various toads. Magnemite portable tape recorder first used. Machine noisy and recording my voice too treble.

ELK #771 Camp 19, 4000', Yos. Valley, Mariposa Co. Calif. Bufo boreas halophilus

Toad placed on table 4-6" from hand mike and grasped behind forelimbs between thumb and index finger. Room temperature 24° C.

ELK #747 (#746) Bufo canorus NE side Highland Lake, 8500 ft., Alpine Co., Calif.

ELK #694 Bufo (boreas) exsul Deep Springs Valley, 5200 ft., Inyo Co., Calif. These notes are not unlike the weak notes uttered by a few males I got at Deep Springs June 13, 1955, although the call notes of a male are lower

Aug. 26 — Use of museum # Pentron recorder (non portable) Room temp. same. Note truer recording fidelity.

ELK #807 Bufo boreas halophilus. Yosemite Valley 4000 ft.

Sept. 4 ELK #820 B. canorus from Tioga Pass, 9900 ft. Mono Co., Calif. Toad cold at first (6:45 A.M.) but warmed up to room temperature due to handling.

E L Karlstrom
~~1955~~
1956

Recording data

Feb. 2 Reel No. 2 (June 8, Kaiser Pass meadows Fresno Co., Calif). Some good calls of B. canorus although the Magnemite portable machine was recording too treble. My voice sounds unnaturally high. Also some wavering of volume level.

First 2/3 rds of tape includes many good calls involving 3-4 males. I interjected "suggest analysis individual toad at this point" to introduce the best individual calls. I need the 1954 canorus recording to check for ~~ac~~ faithfulness of this tape.

Note near end of tape some "release" or "protest" notes by males under natural conditions. These compare well with those recorded experimentally. Whistled inflected notes are mine.

Reel No. (3-4) in part Deep Springs Valley, Inyo Co. June 13, 1955. Faint but quite auditable low whistling notes in groups of 2-4 are undoubtedly Bufo boreas exsul. The low "chugging notes" I had attributed to Scaphiopus but R.C. Stebbins does not remember spadefoot notes of this nature. A.M. Miller cannot relate them to any bird, young or old. Stebbins and Jim Anderson somewhat incredulously refer them to acris. Turner agrees in part but feels the notes are too low for acris. This is an intriguing problem. Deep Springs School has fairly close tie-in with Cornell. Could

ELKarlstrom
1956

Recording data

Feb. 3 there be exotic tree-frogs here? Possibly a varied species (pigeons) ??. RCS suggests a direct comparison with the Cornell "Sounds of the night" record. Paul Anderson independently came up with Acris but noted definite differences. He suggested the possibility of a mole cricket or other insect.

Reel no. 10 Experimental recording of "protest" notes. First ~400 feet with magnemite at Yosemite Museum too treble and noise from machine.

#741 ELK *B. boreas halophilus* Yos. Valley
746 & 747 *B. canorus*
694 *B. b. exsul* Deep Spgs.

200 feet with Yosemite Natural History Association Pentron recorder (AC operated) with much better results.

#807 *B. b. h.* good near end
820 *B. con.* toad warmed up and rate increased

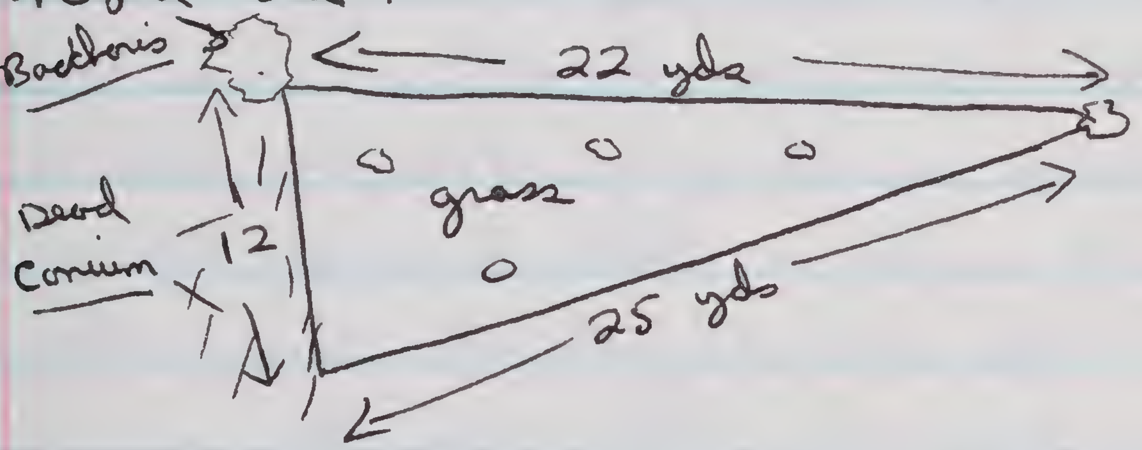
Field Notes 1955

Co^{60} Tag Retrieving Experiments

ELKarlstrom
1955

Co^{60} tag retrieving experiments

Nov. 27 Big Springs Canyon, Tilden Park, Contra Costa Co. Calif. Attempt to evaluate effectiveness of tagging method by searching out tagged toad and salamander with Geiger counter (Tracerlab ß x survey meter) and Scintillometer. Used sloping (about 20°) grassy hillside in area where Bob Stebbins has marked Sceloporus for pineal body studies. Stebbins, daughter Melinda, son John helped out.



Above area mentally staked out as limits for hiding the animals. Dry dead grasses (Avena etc.) to about one foot height. Small rocky outcrops scattered through grass - none larger than 1+ foot across and 10-12" above ground. Soil moist due to downslope seepage following recent rains. Clear sunny skies. Time 1:15 - 2:10 P.M. Procedure was for 2 of us to plant the animals while others some 50 yards away with backs turned. Moved with instruments parallel to each other about 4-5 feet apart. Scintillometer was much more effective in picking up response 8-12 feet away, but Geiger counter still effective. Results on separate sheet.

E L Kohlstrom
1955

Co^{60} (Recovery of tags)

Animal &/or Tablet used	mr/hr. Rel. strength	Time req.	Nature of site, etc.
Bufo #4	110	12 min	In soil under a rock.
Taricha #2	~15	—	Salamander moved out of area.
Same toad	-	3	Down in soil under 12" rock
" salamander	—	3½ [6½]	half buried. Salamander in burrow.
Same	—	5	Buried toad 1" soft soil.
	—	4½ [9½]	Salamander in fragmented rocky outcrop

We were misled first run by working around the spot in triangular area where toad had been handled and water from its jar poured on the ground. Hence it took a longer time than other runs. *Taricha* had been let loose in grass and was about 5-6 feet out of the area. I picked it up (before seeing it) with Scintillometer after Stebbins suspected that it had walked out of the Δ area.

Field Notes 1956

Catalog

nos. 847-1008

E L Karlstrom
1956

Catalogue

1.3 mi. N., 0.2 mi. W Civic Center Richmond, Contra Costa Co., Calif. Feb. 7, 1956

847	Bufo	boreas	halophilus	ad.	♂
848	"	"	"	ad.	♀
849	"	"	"	ad.	♂
850	"	"	"	ad.	♀
851	"	"	"	ad.	♂
852	"	"	"	ad.	♀
853	"	"	"	ad.	♂
854	"	"	"	ad.	♀
855	"	"	"	ad.	♂
856	"	"	"	"	"
857	"	"	"	"	"
858	"	"	"	ad.	♀
859	"	"	"		♂
860	"	"	"	ad.	♀
861	"	"	"	"	♀
862	"	"	"		♂
863	"	"	"		"
864	"	"	"		"

1.5 miles by road west of Skaggs Springs, Sonoma Co., California
March 18, 1956

865	Gerrhonotus	coeruleus
866	Aneides	flavipunctatus
867	"	"
868	"	"
869	"	"

E L Karlstrom
1956

Catalogue

Near Fernleaf and Blake Street, Los Angeles, Los Angeles Co., Calif. March 31, 1956

870 Bufo boreas ♀ (coll. by Timothy Gee)
871 " " ♂ (breeding) " " " "
872 " " subadult " " " "

873 Uta stansburiana
874 " "
875 Sceloporus occidentalis

Hwy 466 at Clear Creek, 12 mi. NW of Tehachapi Kern Co., Calif., april 21, 1956.

876 Masticophis lateralis
& 3 mi N, 2 mi W Victorville, San Bernardino Co., Calif. april 21, 1956
877 Bufo microscaphus
878 " "
879 " "
880 " "
881 " "
882 " "
883 Bufo boreas adult ♂
884 " "
885 " "
886 " "
887 " "
888 " "
889 " "

ELKarlstrom
1956

Catalogue

3 mi. N, 2 mi W of Victorville, San Bernardino Co., Calif. April 21, 1956

890 Bufo boreas

891 " "

~~892 " "~~

Crystal Creek Ranch, 9½ mi. (by rd.) S of Lucerne Valley S.B. Co., California April 22, 1956

893 Sceloporus occidentalis

SW side of Baldwin Lake, 6674 feet, San Bernardino Co., Calif. April 22, 1956

894 Bufo boreas (subadult) col. by R.M. Eakin

895 " " " " " " "

896 " " " " " "

897 " " adult

898 " " "

near Metcalf Bay, S side Big Bear Lake, 6750 ft S.B. Co., Calif. April 22, 1956

899 Bufo boreas

900 ~~890~~ " "

901 ~~891~~ " "

902 ~~892~~ " "

903 ~~893~~ " "

904 ~~89~~ " "

905 " "

Forest Home, 5240 ft, in Mill Creek Canyon, San Bernardino Co., Calif. April 22, 1956

• 906 Gerrhonotus multicarinatus D.O.R.

ELKarlstrom
1956

Catalogue

Console Springs ~~Reche Canyon~~, ~~5~~ mi. S ×SW of Redlands, ~~S.B.~~ Riverside Co.
Calif. April 23, 1956

· 907 Gerrhonotus multicarinatus (dead on dirt road)
908 Sceloporus occidentalis

Reche Canyon, 6 miles S of Redlands, 1800 ft.
S.B. Co., Calif. April 23, 1956

909 Phrynosoma coronatum

Banning Canyon in San Gorgonio River, 4500 feet,
Riverside Co., Calif. April 23, 1956

910 Rana muscosa

Tahquitz Canyon, 1 mile SW of Palm Springs, ~~1175~~ 500 ft
Riverside Co., Calif. April 23, 1956

· 911 Hyla arenicolor
· 912 " "
· 913 " "
· 914 " "
915 " "
916 " "

Canyon 2½ mi. SE Cabazon 2200 ft, Riverside
Co., Calif. April 24, 1956

· 917 Xantusia henshawi
· 918 " "
· 919 " "
920 " "
921 " "
922 " "

E L Karlstrom

Catalogue

2½ mi. SE Cabazon, 2200 ft., Riverside Co. Calif. April 24, 1956

923 Xantusia henshawi

924 " "

925 " "

926 Uta mearnsi

1½ mi. SE Cabazon, 1800 feet, Riverside Co. Calif., April 24, 1956

927 Uta mearnsi

~~928 " "~~ lost (died)

929 Sceloporus orcutti

930 Pituophis catenifer

mouth Tahquitz Canyon, ~~400~~ 500 ft., 1 mi. SW Palm Sprgs., Riverside Co., Calif. April 24, 1956

931 Bufo punctatus

932 " "

3 mi. NW 1000 Palms P.O., 250 ft, Riverside Co., Calif. April 25, 1956

933 Uma inornata

934 " "

935 " "

936 " "

937 Dipsosaurus dorsalis

938 " "

939 Uta graciosa (coll. by R.M. Eakin)

Tahquitz Canyon, 700 feet, 1½ mi. SW Palm Springs, Riverside Co., Calif. April 25, 1956

940 Cnemidophorus tigris

941 Uta stansburiana

E L Karlstrom
1956

Catalogue

Amboy Crater, 3 mi. W x SW of Amboy, 600 feet,
San Bernardino Co., Calif. April 27, 1956

942 Uma scoparia
943 Callisaurus draconoides
944 " "
945 " "
946 Uta stansburiana
947 " "

3 mi. N, 2 mi. W Victorville, 2600 feet, San
Bernardino Co., Calif. April 27, 1956

948 Xantusia vigilis
949 " "
950 " "
951 " "
952 " "
953 " "
954 Eumeces gilberti
955 Sceloporus occidentalis

Ahwahnee Mdw., 4000 ft., Yosemite Valley
Mariposa Co., Calif. June 28, 1956

956 ~~Bufo boreas~~ Rana catesbeiana
Same locality June 29, 1956
957 Bufo boreas

ELKarlstrom

Catalogue

300± yards NE Tioga Pass Ranger Station,
9900 ft., Mono Co., Calif. June 29, 1956

958	Bufo	canorus	(series of "yearling" juveniles)		
959	"	"	eggs.		
960	"	"	ad.	♀	
961	"	"	"	"	
962	"	"	"	"	
963	"	"	"	"	
964	"	"	"	"	
965	"	"	"	"	
966	"	"	ad.	♂	
967	"	"	"	"	Co^{60} tagged
968	"	"	"	"	" "
969	"	"	"	"	
970	"	"	"	"	
971	"	"	"	"	
972	"	"	"	"	
973	"	"	"	"	
974	"	"	"	"	
975	"	"	"	"	
976	"	"	"	"	
977	"	"	"	"	
978	"	"	"	"	
979	"	"	"	"	

Faith Valley, 7500 ft., Alpine Co., Calif.
June ~~29~~ 30, 1956

980	Rana	muscosa	ad.
981	"	"	"

E L Karlstrom
1956

Catalogue

1/2 mile E x S E of the nipple, 8200 ft., Alpine Co., Calif. June ~~29~~ 30, 1956

982 Hyla regilla
983 " "
984 " "

NW end Upper Blue Lake, 8100 ft, Alpine Co., Calif.
June 30, 1956

985 Hyla regilla
986 Bufo boreas ad. ♀
987 " " " "
988 " " ad. ♂
989 " " "
990 " " "
991 " " "
992 " " "
993 " " "
994 " " "
995 " " "
9~~8~~96 " " "
997 " " "
998 " " "
999 " " "
1000 Bufo canorus ad. ♂ MVZ 64877 (first case of sympatry w/ boreas)
1001 " " eggs MVZ 64878
1002 Bufo boreas ~~subadult~~ ad. ♂
1003 " " "
~~1004 " "~~ "
1005 " " "

E L Karlstrom
1956

Catalogue

NW end Upper Blue Lake, 8100 feet, Alpine Co., Calif. June 30, 1956

1006	Bufo boreas	ad. ♂	
1007	"	"	"
1008	"	"	"
1009	"	"	"
1010	"	"	"
1011	"	"	"
1012	"	"	"
1013	"	"	"
1014	"	"	"
1015	"	"	"
1016	"	"	
1017	"	"	
1018	"	"	
1019	"	"	
1020	"	"	

Error in recording. No specimens.

E L Karlstrom
1956

Catalog

Augustana College campus, Rock Island,
R.I. Co., Illinois Oct. 12, 1956

1007 Thamnophis radix

20th Ave. & 30th Street, Rock Island
R.I. Co., Illinois Oct. 19, 1956

1008 Didelphis virginianus skull & skin (latter destroyed June 1957)

Field Notes 1956

Journal

ELKarlstrom
1956

Journal

April 21 Left Berkeley 6:50 A.M. in MVZ truck with Bob Stebbins and Dick Eakin. Overcast but mild. Walnut Creek to Hwy 50.

3 white pelicans flying N 8:30 A.M. San Joaquin River. Hazy, warm in Valley. Modesto 8:40 A.M. (27824). Hwy 99 south.

D.O.R. 'possum on edge of highway (7839.7) Merced (7858.0). Fresno 10:25 A.M. (7905.) Bakersfield 2:45 P.M. (8001.8) Stop for groceries, supplies Westchester Shopping Center. First collecting stop on Hwy 466 SE by E of Bakersfield. Bottom of sandy wash is moist. Grass green on north slopes, starting to brown on south slopes. Thunderstorm to NE in southern Sierra. 2:15 P.M.

2 *Sceloporus occidentalis*

3 *Uta stansburiana*

2 ravens, 1 red-tailed hawk seen. A short distance down highway flock of 35-40 tri-colored redwings, 1 linnet, several meadow-larks. Poppies, owl-clover, lupine, fiddle-neck still blooming favorable exposures.

D.O.R. gopher snake just hit (8025.1) 3:25 P.M.

466 at Clear Creek (8027.7)

1 *Eumeces gilberti*

1 *Masticophis lateralis*

1 *Ensatina e. croceator*

E L Karlstrom
1956

Journal

April 21 466 at Clear Creek (cont.)

1 *Anniella pulchra* Left area 4:50 P.M.

Water flowing Clear Creek; afternoon mild with hazy sun. Supper 6:40 P.M. Mojave (8058) We started running road from Mojave on. Better road conditions (less traffic) from junction 466 and 395. An alternate old stretch of the highway parallels 395 for a number of miles. Night temps. not too cool for reptiles (RCS) but we found none. Pavement cool; winds very strong at Mojave at sunset. Camped at Stebbins' favorite site 3 mi. N, 1 mi. W of Victorville along Mojave River. Mild, moonlit evening.

Bufo microscaphus

B. boreas halophilus

Sandy areas above river level slightly dampish under the surface. Temperature at night down to

April 22 about 10° C. at 6:00 A.M. Breakfast Victorville then SE through Apple Valley State 18. Sunny, warm. Took Crystal Creek Ranch road due south from Lucerne Valley.

2 *Ensatina e. croceater-klauberi* juveniles (a third juvenile was returned after being collected)

1 *Gerrhonotus multicarinatus*

Sceloporus occidentalis

On returning northward to Lucerne Valley we collected two reptiles on the dirt road.

1 *Masticophis flagellum* 1 *Phrynosoma platyrhinos*

E L Karlstrom
1956

Journal

April 22 Estimate locality (mileage record lost) as 3.5 miles south of Lucerne Valley (town) The red racer lay stretched out at edge of road. It apparently was not really warmed up, since I was able to noose it with a leather noose at the end of the heavy snake stick. The horned lizard was spotted running at a terrific clip across the road in front of us, tail erect as it ran. Bob found it on top of a concrete mound about 14 feet from the road edge. We returned to State Hiway 18 and continued up back side of San Bernardino Mts. to Baldwin and Big Bear Lakes. Sceloporus magister (few) seen basking on boulders along the highway SE of Lucerne Valley. Also Uta stansburiana and Sceloporus occidentalis.

Baldwin Lake, 6674 ft, San Bernardino Co. We arrived about 11:30 A.M. Lake dry and twisters swirling up dust. First stop at north end of playa. No anurans evident save retaining pools for watering cattle. We continued around east and south end of lake. Dick Eakin collected a juvenal B. boreas in small spring seep south end of lake. Only toad spawn found same area (recently hatched out larvae). At SW end of lake near the neck portion of the westward-extending arm of lake adult and subadult B. boreas (4) taken. Continued to Big Bear Lake. Sunny but cool breeze.

E L Karlstrom
1956

Journal

April 22 East end of Big Bear Lake, 6750 ft, S.B. Co., Calif.
2 Sceloporus graciosus
Metcalf Bay, Big Bear Lake, 6750 ft. We drove part way out to Lake. Scraped-over area produced subadult and adult toads ( ) when we dug in loose soil at edge of shallow ponds.
Bufo boreas
From Metcalf Bay we doubled back eastward to road to Moon Ridge. From ski area we drove Camp Radford fire road to canyon to the south and paved road connecting with Mill Creek Canyon. Snow patches along road above 7000 feet. Skies clear but cold winds.
D.O.R. (just hit) adult Gerrhonotus multicarinatus on road Forest Home P.O., 5240, Mill Creek Canyon 4:50 P.M. Stayed overnight home of John Goodman, parasitologist at Redlands University at 6000 foot level, Mill Creek Canyon. In conversation John mentioned presence of both Crotalus mitchelli and Crotal. viridis oreganus in this canyon. Also 3 Trimorphodon taken, one per year, on Mill Creek Canyon road 3000-3600 feet - all D.O.R.

April 23 Left with John Goodman for Redlands at 7:20 A.M. Clear, mild morning. Ensatina e. ~~eisch~~ e. locality at about 5000 foot level, 1/5 mile above Forest Home P.O. Rana aurora reported from pools in river bottom. Lichanura collected alive about 3200 feet. Salvadora D.O.R. slightly

35.6
Locust

EL Kadstrom
1956

Journal

April 23 lower down. Brief visit Univ. of Redlands where Stebbins received 3 Ensatina e. eschscholtzi from John Gordon. Following John's lead we drove SE to Redlands Blvd. Junction of Blvd. and Reche Canyon Road (435.6 John's car)

1 Phrynosoma coronatum on road (437.5) 8:48 A.M. Console Ranch (438.2) Search for salamanders at springs unsuccessful

1 Phrynosoma coronatum adult at Ranch by Dick Eakin.

Continued NW to Console Springs (440.7), a more mesophytic situation with a sycamore grove nestled in a stream bed along road.

1 Pituophis catenifer large adult.

1 Gerrhonotus multicarinatus dead on dirt roadway.

3 Sceloporus occidentalis.

I spotted a couple of Cnemidophorus but couldn't get near them as they tore into greasewood clumps. We doubled back SE along Reche Canyon Road. Stop near Ranch again but on main road.

1 Phrynosoma coronatum from top of large boulder

1 Batrachoseps attenuatus in spring seep area.

Adult Crotalus viridis dead and decomposing in ditch side of road. Weather clear and hot with mild breeze. Hwy 60 to Banning 11:10 A.M. District Warden (Fish & Game) Frank Brundage helped to get permission to get on water company property up Banning Canyon. We spent entire afternoon working

E L Karlstrom
1956

Journal

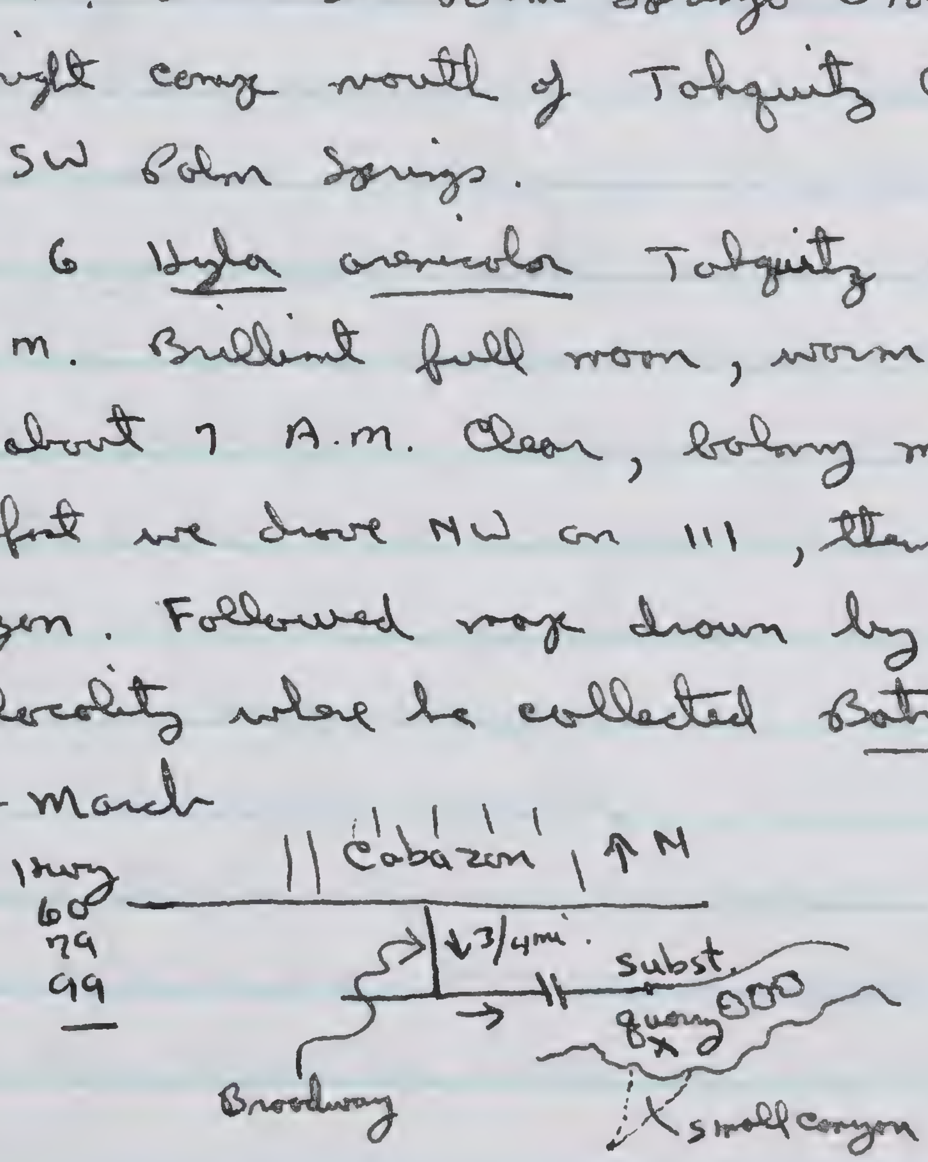
April 23 up Banning Canyon.

1 *Rana* muscosa

Head of Burnt Canyon above Mill Canyon. Drove Water Canyon truck as far as road passable, then hiked stream canyon to waterfall. Bob collected three *Ensatina*. *E. e. klauberi* up near head of canyon and *E. e. eschscholtzi* lower down. Returned to Banning 6:30 P.M. Afternoon hazy with some cloudiness, cool up canyon 5500 feet elevation. Drove to Palm Springs State Hwy 111. Overnight camp mouth of Tahquitz Canyon, one mile SW Palm Springs.

6 *Hyla arenicolor* Tahquitz creek about 10 P.M. Brilliant full moon, warm (in low 70's).

April 24 Up about 7 A.M. Clear, balmy morning. After breakfast we drove NW on 111, then west to Cabazon. Followed map drawn by Van Sooy to locality where he collected *Batrachoseps* in mid-March



Quite dry at surface, and no salamanders found this locality.

1 *Pituophis catenifer* Good size record

1 *Uta mearnsi* striped racer

1 *Uta stansburiana*

E L Karlstrom
1956

Journal

April 24 Birds seen: western kingbird, mockingbirds, mourning doves, linnets. After lunch at Cabazon we returned to work up a large canyon about 2½ miles SE of Cabazon. 1:00 P.M to 5:15 P.M. Kodachrome # 5 & 6 flowering cactus. # 7 across Gorgonio Pass facing northward.

3 *Sceloporus orcutti*

3 *Uta mearnsi*

10 *Xantusia henshawi* (3 preserved)

3 *Sceloporus occidentalis*

Dry, warm windy day. Good stream flow in canyon. Interesting association of grease-wood and creosote bush. Wild grape, poison oak, alder in lush canyon bottom. *Eriodictyon* sp. (?), flowering cactus, *Ribes* some *Yucca whipplei* (~~spell~~ ?) present. A rugged canyon with huge granite boulders. Canyon wrens, black-chinned hummingbirds, California quail abundant. Thought I also heard a green-backed goldfinch. Stebbins and I took from stream.

1 *Rana muscosa*

2 *Hyla arenicolor*

Returned to Palm Springs for supper. Road collecting began after 7 P.M. beginning on State highway 74 from Palm Desert on State Rt. 111. mileage start (360.3)

1 *Phyllorhynchus decurtatus* juv. (361.1)

1 *Lichanura roseofusca* adult 7:25 P.M.

Bright full moon. ½ inch above ~~sand~~ fine gravelly shoulder at 7:30 P.M. 25.2°C. Gravel substrate 26.5°C. We doubled back (362.1) with no

ELKorbstrom
1956

Journal

April 24 further success. Returning on Hwy. 111 we drove northward on 1000 Palms road which takes off near Rancho El Mirage. Near 1000 Palms P.O. the road heads straight west back to Palm Springs. Sandy desert out here on valley flats with the wind-blown sand drifted on to edge of road many places. No success. Bright full moon may restrict reptile activity but night air temperatures also have dropped off. Return to our Tahquitz Canyon camp-site.

2 *Bufo punctatus* from Tahquitz Creek 9:45 P.M.

April 25 After breakfast we moved out on sandy desert to locality 3 mi NW of Thousand Palms P.O. (Garnet Dunes)

Began search 8:20 A.M. Slightly overcast. Young lizards *Uma inornata*, few *Callisaurus* out. Air temp 1" above sand (bulb shaded 25.1°C. at 9:00 A.M.; sand 34.5°C. in open situation. By 10:00 A.M. we began to collect more and larger *Uma*. Air temp 1" above sand 31.5°C. Sand temp. 39.0°C. First *Dipsosaurus* collected about 10:45 A.M. when conditions still hotter. Cloud cover gradually disappeared 9-10 A.M. Kodachrome #8 habitat shot.

18 *Uma inornata*
2 *Callisaurus*
1 *Cnemidophorus tigris*
1 *Crotaphytus wislizeni*
8 *Dipsosaurus dorsalis*

No snakes seen. Lack of sidewinder tracks suggest

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Journal

April 25 that C. cerastes hasn't been active in area. Desert iguanas and Uma observed on highway when we returned to Palm Springs at noon. Hot day (in 90's) with slight haze over mountains. Worked afternoon in smaller Canyon just NW of main Tahquitz Canyon, 1½ mi SW Palm Springs. One Crotaphytus collaris seen. Birds included phainopepla, desert song sparrow, Calif. quail. Warm but shaded in canyon.

1 Sauromalus obesus, 1 Cnemidophorus tigris, 3 Uta stansburiana. Road work 7-8:30 P.M. same route as last night. Too cool. No reptiles.

April 26 Left Palm Springs 7 A.M. for Indio and lower Coachella Valley. Hwy 111 to Coachella and U.S. 99 south on west side of Salton Sea. Warm and windy.

Kodachrome #9 - 200 ft. below sea level facing west toward Santa Rosa Mt. showing old sea ~~level~~ level beach W of north end Salton Sea.

We collected sand dune area east of Hwy 99 about 3 miles N by NW Kane Springs. Winds up to approximately 25-30 miles per hour kept lizard activity down. 2 horned owls flushed. Few Uma notata seen, also a few Uta stansburiana and Callisaurus draconoides. No snake tracks and few lizard tracks left leeward side of larger dunes. Mesquite and creosote bushes. D.O.R. Texas nighthawk

2 Uma notata 10:30 - 12:00 A.M.

Quick check behind Kane Springs. Unhospitable lady at abandoned service station prevented our checking springs near house for Rana pipiens

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April 26 previously reported this locality. Dick Eakin noosed 1 *Dipsosaurus dorsalis* subadult 12:45 P.M. Westmorland for lunch. Gale winds and sandstorm continued into afternoon. Took Center Street north. 1 D.O.R. subadult *Masticophis flagellum* 1 mi. N Westmorland, Imperial Co. Specimen not kept. D.O.R. striped skunk 4 mi. N. Westmorland. Skin rolled inside out, probably by a turkey buzzard, but scent glands untouched. We drove westward on Estelle Road to Obsidian Buttes. Brackish pools around Buttes which have resulted mainly from the bulldozing excavating by a gravel outfit (pumice for building blocks?) located near Buttes. No lizards seen. Visited Mud Pots about 3 mi NE of Obsidian Buttes. These supposedly were the source of some shots in Disney's "Living Desert"! Barely a bubbling up of silty water in a small ~~pool~~ 4 feet wide However, cones of mud over extensive area (now dry) suggest considerable gas eruption ~~has~~ occurred.

Mourning dove clocked by truck speedometer ~23 m.p.h. Wind about 20-25 m.p.h. at right angle to bird's flight.

1 dead *Trionyx* found dead east shore of Salton Sea 1/4 mile NW of Mud Pots. adult 15-16" carapace length. Apparently washed up by wave action. Bob Stebbins knows of no record of

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Journal

April 26 species in Salton Sea. This area SE of Sea is richly supplied with irrigation ditches carrying water from Colorado river drainage, so it is easy to see how the turtles could find their way into the Salton Sea itself.

1 D.O.R. record *Crotalus atrox* about 1 mi. S mud pots (~6 mi. SW of Niland) Head and rattles cut off. Total length ~ 3 feet.

Salton Sea National Wildlife Refuge and adjacent agricultural lands wonderful place for bird observations. We observed avocets, dowitchers, coots, sandpipers, snowy egrets (3), herring (?) gull, mourning doves, shrikes, roadrunner (1), etc. Arrived Niland 5:10 P.M. Cool, continued heavy dust storm to west. We drove directly NW on State 111 to Palm Springs. Light rain as we approached Palm Springs 6:30 P.M. Heavy storm clouds over San Jacinto mts. Continued north after supper to Smoketree near Twentynine Palms. Sky clear but stiff cold wind.

April 27 Cool clear sunny morning. Drove westward to Indian Cove in Joshua Tree national monument. Kodachrome #11 of eroded "badlands" facing W. #12 of Bob and Dick beside blooming creosote bush parking area Indian Cove. #12 of *Hyla arenicolor* habitat Indian Cove (F7 at 1/25 th) looking up granite chimney. Water in granite pot-holes. Stebbins paint marks placed here a year ago where *Hyla* marked have eroded off. No marked canyon

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Journal

April 27 tree-frogs found among 3 captured. *Hyla* tadpoles recently hatched ~ 1 cm. length. Birds: Rock wren, Gambel quail (5-6), ♂ black-headed grosbeak, ♀ phainopepla, (3-4) green-backed goldfinches.

Kodachrome #13 & #14 Bullion mts. from highway leading north to Amboy. Creosote-*Atriplex* association. Amboy Crater lava outflow.

1 *Dipsosaurus*

1 *Uma scoparia*

10 *Callisaurus*

3 *Uta stansburiana* — one taken 1935 feet on S crest of cinder cone. Population probably followed *Atriplex* + creosote (?) through a draw on south side of rim. Absence of large lizards. No chuckawallas spotted. Overcast most of period 10:15 - 1:15 with mild breeze. Clearing around 1:30 P.M. 1/5 of sky clouded with patchy cumulo-stratus clouds.

Continued west on U.S. 66 to Barstow, then 66 and 91 toward Victorville. Mojave desert areas windy and cool, overcast most of afternoon.

3 mi. N, 2 mi. W Victorville, San Bernardino Co.

6 *Xantusia vigilis*

1 *Eumeces g. rubricaudatus*

1 *Sceloporus occidentalis*

Fairly fresh sign of *Sauromalus* and *Sceloporus magister* on rocks east of highway, but overcast, strong cool winds kept all surface activity down. I found the *Xantusia* under bark of felled

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1956

Journal

April 27 cottonwood and the *Eumeces* and *Sceloporus* at base of a rotted stump. All lizards sluggish. Air temperature in low 50's. 5:00 P.M. continued north on U.S. 395 to U.S. 495. West to Mojave for supper, then into Bakersfield where we stayed with Joe and Geri (Jenny) Gorman.

April 28 Returned to Berkeley 1:45 P.M. after drive from Bakersfield. Cool weather continued. San Joaquin Valley appears as if recent rains had hit area.

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1956

Journal

June 28 Left Albany 5:15 A.M. with family in Plymouth. Merced 8:30 A.M., getting hot even by this time. Yosemite 11:30 A.M. clear and hot. Afternoon at museum. Snow depth data from Homer Hoyt Administration Bldg. Brief night check Stoneman and Ahwahnee mdws 10-11:15 P.M. *Hyla* adults heard and numerous tree-frog tadpoles nearing metamorphosis. No toad larvae seen or adults. One calling male bullfrog Ahwahnee mdw., probable escapee from Ahwahnee Hotel pond where several had been introduced. Evening cool and clear. Merced River exceptionally high as is general water table Valley floor. Much standing water along roads and tall, lush vegetation. Overnight stay Camp 19.

June 29 Left Valley at noon for Tioga Pass. Lunch Tuolumne mdws 2:30 P.M. Tuolumne River forming large flood lakes over broad meadow. Much snow on peaks and down slopes. Tioga Pass 3:15 P.M. Snow depth along road near the Pass height of car. Mary and Bill Hood reported depth here of 10 feet a week ago (near parking lot south of Entrance Station) Dana meadows still 3/4 ths covered with snow. Bob House, Ranger Tuolumne meadows District, estimates a melt of several feet per day past few days. From my experience of past two summers, the season is about three weeks later than 1954 or 1955. *Bufo canorus* out and breeding but only vicinity of study pond where standing water available.

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Journal

June 29 Tioga Pass — sunny afternoon but strong cool breeze. Sky clouded up eastern ½ of sky late afternoon. Collected 19 adults, recently laid eggs, and a series of "yearling" toads at the pond edge. Single Co^{60} tagged adult ♂ recovered on surface, first detected with Scintillometer, then seen. Other marked animals (no radioactive tags) recovered — see B. canorus account. Heavy melt-off in meadow.

Left Tioga 6 P.M. Supper Leevining, then north via U.S. 395 to Bridgeport. Drove north past Sonora Pass road (State 8 & 395) junction to relatively new State Hwy 89 westward past Heenan Lake to State No. 4. Then N to Woodfords. Information County Road maintenance Station, 3/4 mi. south of Woodfords, as to accessibility of road between Lower and Upper Blue Lakes. Foreman reported it took about 2 weeks instead of usual 4-5 days to get road open to Lower Blue Lake. Heavy rain's caused icing of snow pack. We drove State No. 88 SW to Blue Lakes road. First stop Faith Valley, 7500 ft., a locality where I collected boreas larvae a year ago. None found this time. Rana muscosa adults (2) collected. Clusters of eggs (to neurula stage) in slow streams. Next stop at roadside pond Charity Valley, 7700 ft. – Boreas toads more abundant than I've ever seen them, blackening edges of small pools and larger pond. Hyla regilla adults collected stream side

E L Karlstrom
1956

Journal

June 30 ponds in meadow ½ mi. E x SE of The Nipple, 8200 ft. Toads collected here last year - none today. Continued to Lower Blue Lake. Snow drifts along road in lodgepole pine forest. Road impassable beyond a point 2/3 length from SE end of Lake. Only vehicles to make upper Blue Lake were 4-wheel drive jeep-type command cars. I hiked road over much snow about 2 miles to NW end Upper Lake 3 P.M. Day has been clear and mild with light breezes. Ice floating along edges Upper Lake. Heavy erosion on east side, much snow around Lake. Heavy melt at NE end has streams flowing over wide surface area. Heavy willow growth. Collected eggs of Bufo canorus, adult (28 and subadult B. boreas (4-5), a single ♂ B. canorus under log with three adult boreas males. No other canorus found. This is first recognized case of sympatry between species. Alex Calhoun (now of Calif. Fish & Game) had collected a male of each species at Upper Blue Lake but they were both called boreas at Stanford museum where I uncovered the fact. Single Hyla also collected.

Returned to car at Lower Blue Lake 6 P.M. Watered the amphibs for return trip. Some good-looking ponds near west side Carson Pass. Returned home via Jackson, Stockton, Tracy. Arrived Albany 2:30 A.M.

Field Notes 1956

Species Accounts

Amphibians

Reptiles

Amphibians

EL Karlstrom
1956

Bufo canorus

June 29 Tioga Pass study area, 9900 ft., Mono Co., Calif.
Photographed study area 3:15 P.M.
Voigtlander 4X5 camera
Plus-X #1 1/200 at F20 facing NE down study area from point 75 yards from station.
#2 of study pool (same exposure)
#3 facing NW across study pond. 1/100 th F24.
Tremendous amount of snow for this late in the season I estimate 4/5 of study area surface has remaining snow cover. on N-facing ridge drifts are to 8-10 feet in depth as revealed by stream cut faces. study pond has snow bank along S edge but mostly free of snow. Hyla and Bufo both calling 3:30 P.M. (D.S.T.) but no heavy chorusing. Sky 3/4 clear with some filmy clouds to east. Bright sun, gale winds up to 30 m.p.h. gusts. Latter makes it difficult to hear amphibian calls.

2 adult males on bare fairly dry ground lee side of clump P. ~~albicaulis~~ albicaulis 60 yards SW of weather station. Air ~~temp~~. 14.5° C. 1" above ground cloacal of one toad 15.8° C. at 4:46 P.M. Both males - no toes clipped. 3rd adult male found 6 feet from other two. apparently basking in full sunlight (sun at 30° angle horizon) Cloacal not gotten since he moved away under a log. Ridge here with pines is an "island" situation between fields of snow. Hibernation site under logs (?)

E L Karlstrom
1956

<u>Bufo canorus</u>

June 29 <u>Tioga Pass</u>, <u>9900 ft.</u>, <u>Mono Co.</u>, <u>Calif.</u>
Study pond double size (length) noted last year. Water flowing very slowly through it. Pair in amplexus 15 yards E weather station site. In water 3/4" deep about a foot from soggy pond border. Vegetation matted from snow. Ice patches to 8" thickness adjacent to pair. Air temp. 1" above pair 14.0° C. Water 1/2" below surface 16.8°. Cloacal ♂ 16.2° C. ~~His~~ body 1/2 out of water. ~~Adult ♂~~ lying in depression 10 feet from pair. Damp ground water squeezes out of it when soil pinched between fingers. Fair background matching, although toad greener than brown sod. Top of toad's body flush with surface, full sun. Air 16.8° C. Substrate 15.0° C. Cloacal 17.1° C. A ~~tagged~~ marked ♂ LF4, LH4
Another amplexed pair 8 feet NE of rock by weather station study pond. 8" from edge. Water 1 1/2" deep. Pair quiet under water as if disturbed by my presence. Water temp. 15.5° C.
Adult pair in amplexus hopping on slope NE of pond 15 feet from water. Cloacal male 19.0° C. Substrate 10° slope toward SW 22° C. ~~in so~~ with bulb just under surface. Dry on surface, damp just beneath. Locomotion of pair very good. Jumps of 6" or more. Most propulsion by ♂ which overlaps end of female. Other adult ♂'s also out basking on dried sod, or sitting in small depressions. Juvenile <u>Hyla</u> and toads NE edge of pond where sod damp.

E L Karlstrom
1956

Bufo canorus

Tioga Pass

June 29 Some juveniles so small I mistook them for spiders also present at edge of pond. I collected a sample of juvenal toads and few *Hyla*. These animals are probably part of hatch I recorded here August 1955. Growth is very slow first year. I have no evidence that these could have over-wintered in pond. Late August and October checks showed no more tadpoles in pond last year.

Voigtlander Plus-X #4, 5, 6 facing E across study pond, 4:30 P.M.

I returned to study pond area with the Scintillometer. One animal picked up by instrument about 25 yards N x NW of weather station site at NE corner of study pond (RF 2, RH 4, LH 4) adult ♂. Background varies between 40-60 c.p.s. (counts/second). I got a reading of 80-90 c.p.s. from toad 3-4 feet away and saw him just about the same time. Reading ~~go~~ with instrument just over him 2000 c.p.s. (fairly weak - just over one mr./hr.) Toad appears as healthy as other untagged males gotten in area. The Co^{60} tag lies directly above anus, slightly to right side. It is loosely held in that position presumably by connective tissue. However, it was easily moved about under the skin by slight pressure of my fingers. I kept toad for observation.

Second adult ♂ (RF 3, LH 4, RH 4) 5 yards from

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1956

Bufo canorus

June 29 Tioga Pass — first. I cannot find the Co^{60} tag although this toad is "hot" registering about 1000 c.p.s. with scintillometer. Incision healed but some discoloration left sacral area. Toad appears healthy.

A third toe-clipped adult ♂ recovered (RF 124) but I must have goofed on recording this animal on my data sheets. No record of this toe-clipping. Also found at NE corner of study pond.

I found no adult toads outside of the ridge top (near tree "X" my map) and at the study pond. Census of toads at pond or in it:

8 ad. ♀ in amplexus, 2 unattached.

8 " ♂ paired above plus about 15 unattached males. Add three males near tree "X". Total 10 ♀s, 26 ♂ or 36 adults. Numerous "yearling" juveniles at pond edge.

Snow melt water in areas near study pond not used for breeding — probably too cold at 5-7° C. Study pond with eggs in it closer to 15° C. at this time.

I also found one *Hyla* ♂ in amplexus with a *canorus* ♀. No other tree-frog adults seen in or along pond, but males calling intermittently from sites in grass.

EL Karlstrom
1956

Bufo canorus

June 30 Upper Blue Lake, 8100 ft., Alpine Co., Calif.
40 yards NW of lake edge at extreme north end of lake. Eggs found first in shallow (to 3") seep 10 x 20 yards. Eggs over area 3' x 18", mostly in two puddles not more than 1 1/2" deep. 1/2 to 2/3rds of eggs swollen and grayish. Air temp 1" above water 17.8°C. Water 1/2" below surface 23.6°C. at 4:03 P.M. (D.S.T.) Bright sun, cloudless sky but brisk NW wind.

Voigtlander Plus-X #7 facing E across pool where eggs discovered. Nipple in background, a jutting peak. Discovery of these eggs confirms sympatry of canorus and boreas at this locality, as indicated by two adult toads in Stanford collection (both had been catalogued as B. boreas).

Adult ♂ found under log 16' x 8" along with 3 adult ♂ boreas and unattached gravid ♀ boreas. Water flowing, to 2" depth under log 18.5°C. I took a photograph (Voigtlander 4x5 #8) of site facing SE toward Lake. First known sympatry of canorus & boreas

Lack of active canorus this afternoon suggests a small population. Conditions appear right for this diurnal beast to be out breeding in numbers. I tramped the willow seeps and checked ponds, under logs, etc. for a good hour. Two adult ♂ boreas were out in the water near the lake edge, but about 26 others were collected under logs. Canorus breeding site typical for species - shallow and

E L Karlstrom
1956

Bufo canorus

June ~~29~~ 30 Upper Blue Lake, 8100 ft., Alpine Co., Calif — silty. Also located 40 yards from edge of Lake. Boreas were concentrated near edge of Lake, and breeding probably occurs along the grassy margin where streams enter. This could represent ecological separation in preference for breeding sites. However, I would be surprised if some hybrid matings do not occur at this locality.

July 30 Paul K. Anderson reports canorus breeding at west side of Saddlebag Lake, 10,051 ft., Mono Co., Calif. on July 29. Some recently hatched embryos. Adults also seen along stream area between Conness Glacier and Saddlebag Lake, about 11,000 feet. The breeding stage suggests a later season. Paul says that there was lots of snow around Saddlebag, chunks falling into the lake. Still some snow along Tioga Lake, too, and patches in Pass area.

E L Karlstrom
1956

Bufo boreas

Feb. 7 1.3 mi. N, 0.2 mi. W of Civic Center, Richmond, Contra Costa Co., Calif. - *Hyla* first heard along railroad track region SW of Albany Hill about two weeks ago. Gerry Robinson and I made a check of Richmond pond sites 9:15 - 10:15 P.M. tonight. Weather warmed up past few days. Air temp. tonight varied between 8-10° C., no breeze. The ponds A & B are small lakes after excessive winter rainfall. We quietly approached pond B from N end where a ditch of water almost extends to Sanford Street. No toads heard but *Hyla* in loud chorus. Adult toads out in water. One ♂ cloacal 11.5° C. at 9:20 P.M. Water temp. 11.8°C. Air 1" above wet grass at edge of pond 9.6° C. We began a census of pond B, covering 2/3 rds of pond border and over shallow south end (pond about 125 yards length) Approx. count: 46 ad. ♂, 4 ad. ♀ and all in amplexus. No toads out of water. None toe-clipped, and we did not clip any toads tonight.

Pond A likewise high with water but less spread out since it lies in a deeper bowl between raised railroad beds. More toads seen here along borders of entire pond. Estimate 75 ♂, 6 ♀ all adult and all in the water. One smallish but breeding size ♀ found unattacked. All other ♀'s in amplexus. No calls heard. Greatest concentration of toads at NE

ELKarlstrom 1956

Bufo boreas

Richmond (cont.)

Feb. 7 edge of pond where shallow water (few to 10-12") fails to cover sedges and grasses. There seemed to be a toad every 3-4 feet on the average. Two pairs in amplexus. To census the toads and check for clipped toes I picked them up and then tossed them out toward deeper water of pond. Returning to this area of concentration after an absence of 3-4 minutes I would find again as many toads in the shallows (where they couldn't have returned). The animal's habit of diving for the bottom when disturbed means almost every other toad is not picked up when one brings a light into an area. There could easily have been 200 adults in pond A alone.

I did not see eggs where amplexing pairs found, although Hyla cluster (only one found) in pond A had embryos in free-swimming stage. Toad eggs probably available, but it would appear that Bufo breeding is just getting underway.

Sexual dimorphism checked when pairs found. ♂'s are more greenish on the average whereas ♀'s tend toward grayish g.c. and possibly more large spots or reticulations. ♂'s smoother skinned and have greater degree webbing hind feet. Some pattern and sex dichromism about 3/4 pairs looked at, but it couldn't be relied upon in all cases. Three toads, 1 ♀ and 2 ♂'s recovered

ELKarlstrom
1956

Bufo boreas

Richmond

Feb. 7 pond A where they had been toe-clipped March 1955 (see data sheets).

Feb. 8 Amplexing pairs kept at 16-17° C. in cold room. One pair produced spawn in jar last night. Eggs resulted and high % fertile, used for Zoology 1B.

Series of adults (all in amplexus) were run against the pigment standards I set up for systematic analysis of *boreas* types. Fresh materials corresponded closely to Richmond preserved toads previously analyzed. The method appears valid. Sexual dichromism again showed up. Of special interest is the lightening of the green ground color of the males when they are in amplexus. Become a yellow green, several shades lighter than those males kept in same aquarium but not "jacked up" by mating clasp with ♀'s. William Riemer has reported this lightening ("graying") phenomenon in breeding *Taricha torosa* (?) males. The light color is lost within 5-10 minutes after male separated from ♀. Some of the dorsal melanin may also be contracted to deeper layers, but the obvious effect is the change in ground color.

Feb. 28 Pair in amplexus again kept at warm temp. in lab. Female still retains eggs. No noticeable lightening of ♂'s green color. Period of retention in ice box (3-4°C.) could have dulled their response?

ELKarlstrom
1956

Bufo boreas

March 3 Richmond locality - arrived here 5:15 P.M. Day clear, sunny but with cool winds. Water level even higher than previous (Feb. 7) visit. East and south margin of pond A surveyed. Hyla tadpoles to 18-20 mm. total length but scarce. Toad larvae have hatched out, and maximum size about 14-15 mm. total length. The toads are so scattered that a half dozen hatches would be expected - yet numbers of toads not high. The rise of a few inches in pond level and some cold snaps might account for the lack of reproductive success to date in pond A. Interestingly enough, I found no egg strings at all. All boreas were from swimming stage (mm.) to larger. No adults seen. Water 16.5° C. Air. 12.8°C. 5:35 P.M.

Continued search of southern neck of pond B. Shallow sedge area had 3 groups of fairly recently laid egg strings (embryos to blastula stages). One group strung out over a roughly circular area 8 or 10 feet across - may be from one female. Water shallow here with a maximum depth of 4 inches. Eggs at varying depths from ½" to bottom. Water temp. 15.8° C. 1" below surface. Air above water 11.0° C. at 5:50 P.M. No hatched-out larvae seen west & south edge pond B. No adults out on land yet, although RR embankment has shaded this pond area for

E L Karlstrom
1956

March 3 Richmond locality — close to an hour at least. Sun actually sets at about 6 P.M. (S.T.) I found a single adult ♂ in the water west edge of pond B. It's movement under the mat of algae gave its presence away. Cloacal temp. 13.5°C., same as surface water layer. This was only toad discovered 5:15 – 6:00 both ponds. One adult Hyla seen, several heard. Breeding probably continues, but today these beasts show their nocturnal ways.

ELK notations
1956

boreas Colorado
Bufo (~~canorus~~)

March 1 Letter from T.P. Maslin at Colorado dated 27 Feb. 1956. In reply to my question regarding habits of toads Colorado, Maslin reports all are montane, above 7000 feet, and the habits are almost identical to B. canorus (which he has seen in the Sierra). Active both by day and by night. Eldora specimens nocturnal and Rainbow Lakes, 20 or 30 miles to north, were collected during the day. See letter for more remarks on problem — and remarks concerning Blue Lake locality label.

April 3 RCS turned over to me some B. boreas from southern California.

Ad. ♂? 7571 RCS 3 mi. N, 1 mi. W Victorville, San Bernardino Co March 24, 1956.

3 toads received from Timothy Gee (undergrad in Zoology) ELK 870-872 from Los Angeles. Color notes separate sheet. Latter collected 9:00 P.M. March 31 following showers 6:30-7:30 P.M. 4-5 blocks from L.A. River.

1956 <u>Bufo boreas boreas</u>

April 12 Notes from letters T. Paul Maslin at University of Colorado.

27 Feb. 1956. "In regard to the species in this area t the toad is strictly a montane form not occurring below 7000 feet. Its habitat is almost identical to that of *B. b. canoris* but the largest specimens are often found in the woods surrounding swampy meadows and beaver ponds. I have found them active both by day and by night. The specimens from Eldora were all nocturnal and actively hunting when they were collected. But the specimens from Rainbow Lakes some 20 or 30 miles fart farther north were collected during the day."

to RCS 7 April 1956. re: additional specimens sent by Maslin. "This material was collected by students... and look as though it had been in formalin too long. There are 12 (actually 11) specimens from the warm spring which is located on the Warm Springs Ranch, 10 miles southwest of Fairplay, Park Co., Col and the elevation is about 10,500 feet. All of these specimens were collected during the day sometime in the middle of September. The other lot of specimens from Rain bow Lakes were also diurnal and actively feeding around the periphery of the lake.

" If your man wants more specific data on how to reac reach the warm spring I can supply him with a map. It is difficult to find."

E. Karlstrom
1956

Bufo boreas

April 21 Mojave River

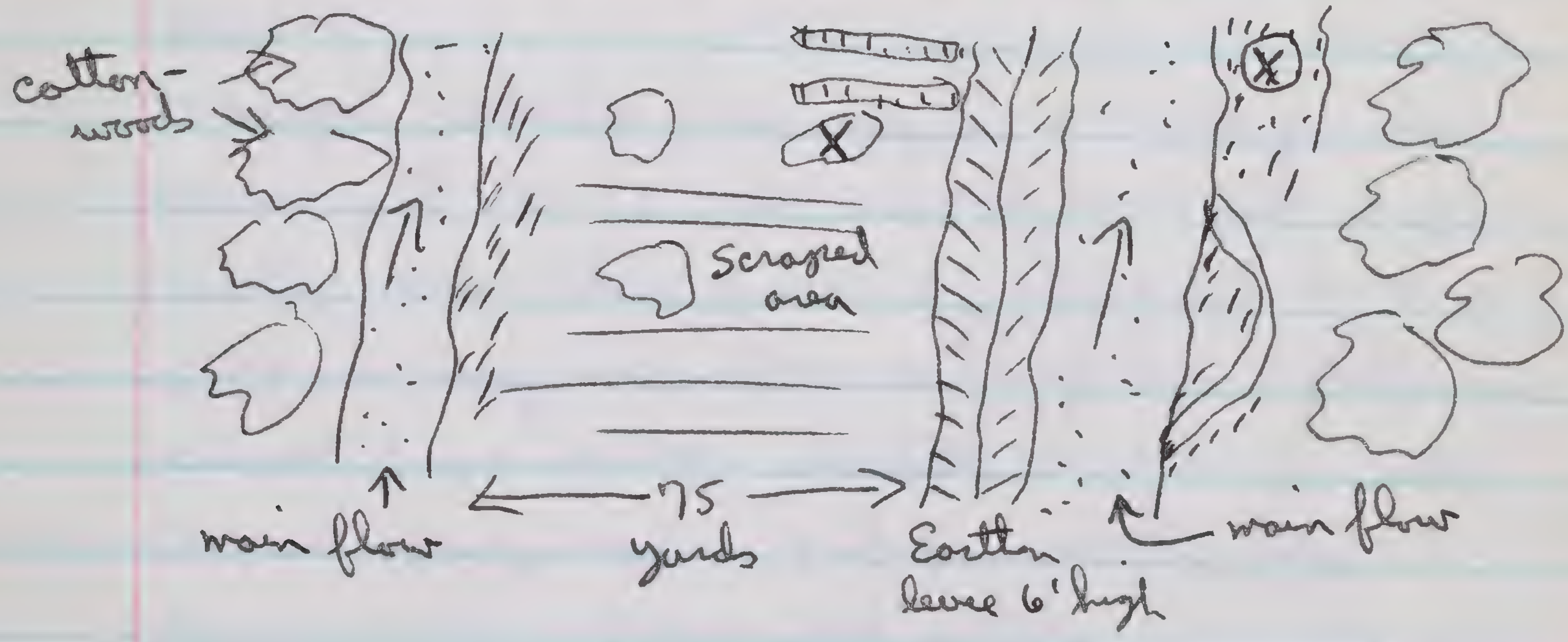
9:40 P.M. Bull-dozed area adjacent to southern delta along the river. Calls of B. microscaphus brought me to this area, some 75 yards in width. Tall cottonwoods border the river on both sides. Hyla clarus active. Bob Stebbins took a couple of ♀ microscaphus up on drying sand. Bull-frogs abundant river margin. Small adult ♂ boreas in puddle 2" deep left by bulldozer. Cloacal was 14.5° C.; water 16.2° Air 12.8° C. At 9:45 I heard the tremulous notes of another ♂ boreas. It turned out to be 10 yards from the first. Again the notes are similar to protest notes but softer and more melodious. Color a grayish-tan very similar to muddy silt. Other males greenish, smooth-skinned. Some to large size (about 85-90 mm.) On several occasions I saw male boreas within a foot or two of male or female microscaphus, but the size difference was striking. However, at 10:15 I searched out a calling group of the latter species. No boreas notes heard here. In the grass 45 feet from deeper (to 1 ½ feet) moving stream I found a ♂ boreas tightly clasping a large ♀ microscaphus. Water 2" deep, a shallow slow-moving overflow area for main stream. Sedges scattered, to 14" height. Water temp. 15.7° C at 10:20 P.M. Cloacal of boreas 14.8° C. Air

E L Karlstrom
1956

Bufo boreas

April 21 12.1°C. Pair removed to bottle. Now I discover ♀ dead and bloated which accounts for her great girth. Later I removed the ♂ and provided another living microscaphus ♀ but the boreas was not inclined to clasp her. Both left overnight in a gallon jug.

The ecological separation of boreas and microscaphus must be on a temporal basis; certainly the species are utilizing the same breeding water. However, I found 3 pairs of microscaphus in amplexus but not a single adult ♀ boreas of the nine I collected. Both Bufo utilize similar breeding water — shallow, slower moving river margin or puddles and ponds or on scraped-over middle river area (X on sketch)



Bullfrogs tend to favor sedges at stream margin but some found alongside Bufo in shallow water. Hyla chorus is raucous but males not seen since they call from flowing or standing water within sedge cover. No eggs or larvae seen tonight.

E L Karlstrom
1956

Bufo boreas

April 22 Southwest edge of Baldwin Lake, 6674 ft.
San Bernardino Co., Calif.

We arrived at the Lake (presently a dry playa with numerous twisters raising the dust) about 11:30 A.M. First checked out retaining ponds at N end, then skirted the lake shore by dirt road to south and southwest. (Joe Goodman of Redlands College indicated to RCS that he'd taken boreas here. One small spring seep yielded a juvenal toad collected by Dick Eakin. A ~~half~~ quarter mile distant a larger pool yield recently hatched out larvae. Water depth 1½" where eggs found. Eggs spread over area 2½ x 1 foot. Air temp. 24.1°C. at 12:20 P.M. Water 1" beneath surface 26.8°C. Sample taken. This pond not over 3 inches deep and about 40 feet across. Dry lake shore 50 yards to NE.

Larger roadside pond near to SW neck of Lake. 80-90 yards x 35 and probably 2-3 feet deep middle. Dick Eakin found 2 subadults (40-50 mm. S-V) in oozy mud under section of log 2 feet across. Cloacal of one 23°C. Substrate 11.5°C. in rodent burrow opening. Log 6 feet from water's edge. Air temp. 19.1°C. Strong, cool easterly wind; blue skies scattered billowy clouds 12:35 P.M.

Big Bear Lake. The upper part of Big Bear Lake is separated by an earthen dam. Water is limited to shallow ponds several acres in extent but maximum depth under one foot. Air Temp. 16.5°C.

E L Karlstrom
1956

Bufo boreas

April 22 Big Bear Lake, 6750 ft., S.B. Co., Calif.
at 1:45 P.M. Water temps 23-25 °C. 1" beneath surface. On the south side the ponds are separated from the scattered yellow (Jeffrey, too?) pine stand by 150 yards and probably a similar distance to the north. Sedges green at pond bottom, to a foot height. No toads or spawn found, although extensive ponds seem suitable habitat. Water extends 300-400 yards E and W and a maximum of 100 yards across. I covered about 150 yards of pond edge. Adults and subadults dug out of soft earth near ponds upper part Metcalf Bay on Big Bear Lake.

June 29 Ahwahnee Mdw, 4000 ft., Yosemite Valley, Calif.
9:50 A.M. Visit here bright warm morning. The water table is very high. Estimate of depth where I had my 1955 depth-marking stick is 4½ feet. High water table results in extensive deep water on south side of road to the River. Sedges and grasses thick and lush, height to 4-5 feet many clumps. Study ponds A & B now continuous ponds of water. Log at SE end of pond A completely submerged. Hyla tadpoles abundant, many just about ready to emerge - hind legs well developed. No Bufo tads observed either last night or today. Adult ♀ (spawned out ?) found active in deep grasses, cloacal 25.6°C. at 10:05 A.M. (D.S.T.) air 1" above substrate 26°C. (bulb shaded) no breeze, hot clear day.

E L Karlstrom
1956

Bufo boreas

June ~~29~~ 30 Upper Blue Lake, 8100 ft., Alpine Co., Calif.
NE side of Lake, 1/3 rd distance of lake from upper (NW) end. Two toads jumped in lake from edge as I approached along road. Basking adult ♂ 23.4°C. on wet soil full sunlight. Air temp 1" above substrate 18.8°C. Substrate 25.8°C. bulb just under soil. Water 1" below surface 16.0°C. where toad jumped. Snow along nearly entire border of lake but patchy on this exposed side. Margins of lake still frozen in places. Westerly winds now have piled up ice at lee side of Lake. Heavy melt and earth slides have torn out road many places, NE side of Lake. Heavy stream and surface run-off slope below The Nipple and willow, pine area NW end Lake.

Pair in amplexus under bough 6' x 6" half buried in bog. Cloacal of ♂ 16°C. Air temp (bulb shaded) 1" above wet grass 17.8°C. 4:25 P.M. Another ad. ♂ 6" from pair. 30 feet from edge lake. Temp edge of lake 14.5° adjacent to small (12-15' x 6') snow patches. Temp 1" below surface 6' out in water 6" deep (possible breeding site with sedges) 18.4°C. Two adult males found in water at lake edge.

Another log 16 x 8" ten feet from one just described. Adult ♂ B. canorus with 3 ♂ boreas one unattached ♀ boreas (gravid) First ~~known~~ proven case of sympatry for two species. How sympatric can you get?! Air and water temps same as

ELKarlstrom

Bufo boreas

June 30 Upper Blue Lake, 8100 ft, Alpine Co., Calif. recorded previous log. Water flowing, to 2" deep under log, 18.5°C.

Voigtlander #8 closeup of site facing SE. The first boreas I found were under a log 8-10' x 1' lying 40 feet from edge of lake. No less than 17 adult males in water to 1½" deep under log. I collected whole group. Two other adult males found in water about 6" deep at lake margin. Later I found 3 subadults in surface seep among low willow growth about 50 yards up from lake. Boreas exhibits its lack of diurnality even at this elevation and under existing cool conditions and high water. 25 of 33 toads were found under logs, including one pair in amplexus. Air temps. 1" above wet meadow were 16-19° C. from about 3:15-5 P.M. in area. No boreas eggs found. Lack of additional (usually ~~no~~ diurnal) canorus a puzzle. This might suggest that boreas out-competes canorus in this local area at least (?)

middle (?) one^cl in glass jar

E L Karlstrom
1956

Hyla arenicolor

April 23 Mouth of Tahquitz Canyon near Palm Springs, Riverside Co., Calif. 9:40 P.M. My first encounter with this species. Chorus heard from about 250 yards from our camping site outside of Palm Springs. Warm, still, moon-lit night (full moon). The stream tumbles out here into numerous pools to 3-4 feet depth. Adult ♂♂ calling from mud bank, 3 inches from still water edge of pool 8 x 16 feet. Hyla facing water. A smallish mottled grayish hylid which gave a good bright eye-shine in my head lamp. Air temp. 20.3°C at 9:46 P.M. Water 1" beneath surface 17.5°C. Call a short inflected rasping burst each lasting about ½ second. More of a "whining" tone than Hyla and uniform in tonal quality. From a distance a male sounds more like a short squawk. Different pitches from different individuals. One may call repeatedly, about 12 calls in 10 seconds and then be silent another 15 seconds before beginning again. Another variant is a lower br-a-a-a-a which sounds like the frog is not warmed up. Favorite calling station appears to be stream mud bank, facing water. Escape by diving into pool and swimming quickly to bottom and then to edge of pool. 5 males calling from margins of a deep pool, artificially dammed up for a swimming hole. Pool 40 feet across, probably 5 feet deep middle. One pair amplexus. ♀ sought to escape into bushes. ♂'s prefer cover of overhanging bushes to large extent. Readily captured about six.

E L Karlstrom
1956

Bufo microscaphus

April 21 *Mojave River*, *3 mi N, 2 mi W Victorville, S.B. Co. Calif*

Bob Stebbins found a couple of adult females up on dry sandy surface some 30 yards from running water in the river. I worked downstream from camp site to a large flattened area where the river bottom had been scraped to build up an earthen levee. Small ditches and pools over an area 75 yards across and extending for hundreds of yards. *Bufo boreas*, *B. microscaphus*, *R. catesbeiana* and *Hyla regilla* all active. The soft trill of *microscaphus* lasts about 8-9 seconds. Terminates abruptly.

An extremely rapid note, soft and ventriloquial. As I write an adult is a foot from my leg and quite undisturbed. The irregular black spots on the gray-tan ground ~~[illegible]~~ color appear quite disruptive. No dorsal stripe whatsoever. Cloacal of this ♀ 16.3°C. at 9:57 P.M. Water 18.1°C. in puddle 1½" deep 8X10 feet length and width. More males heard calling from NW (?) side of river. One pair in amplexus and one dead ♀ clasped by male *boreas* (see *B. boreas* notes). When held, the ♂ *microscaphus* vibrates without any loud trill. Vocal sac round to oval, whitish. Amplexus pectoral and like *boreas*. The eye shine of these toads is reddish and not brilliant like some other anurans.

E L Karlstrom
1956

Bufo punctatus

April 24 mouth of Tahquitz Canyon, 1 mile SW of Palm Springs, Riverside Co., Calif. 9:25 P.M. We started to make camp for the night and first heard the long sustained trill of this toad from about 250 yards away. Locality on same creek about 100 yards farther downstream than where I collected Hyla arenicolor last evening. Calls ceased as I approached a wide shallow place in creek. No more than one or two males had been trilling. First eye-shine I got with lamp was an adult ♂ on a small exposed granite boulder. Air temp. 21.2°C. at 9:35 P.M. Water 1" beneath surface 20.0°C. Brilliant full moon. Another toad seen 6 feet from first, also on a small boulder. Stream 45 feet across, boulder-strewn and no deeper than 8-10" at any one place. Second toad wouldn't respond to my efforts to call him, so I collected the animal. These were only toads I saw along a hundred yards of stream. Hyla arenicolor called from above and below the toads, but tree-frogs were not in immediate vicinity. Rather open situation where toads found with relatively gentle sloping banks and less stream edge vegetation than places I observed Hyla

Reptiles

E L Karlstrom
1956

Uta stansburiana

Hwy 466 SE x E Bakersfield

April 21 "15 mi. SE Bakersfield" – see Stebbins notebook

lizards abundant over rocky outcrops but difficult to noose. 2:15 P.M. Hot sun filtering through thin cloud formation. I noosed two in area plus one adult of Sceloporus occidentalis. Stebbins or Eakin noosed a single individual of each species. Area dotted with granitic outcrops. RCS reported an old locality reported to Grinnell by Ingalls of a gecko "15 miles SE of Bakersfield." This area could be the locality but none has ever been taken here, according to Stebbins. Bottoms of sandy washes moist. Some daisies, Phacelia, a mint still in bloom.

E L Karlstrom
1956

Masticophis lateralis

Calif.

April 21 Hwy 466 at Clear Creek, 12 mi NW Tehachapi, Kern Co.
4:25 P.M. Snake lying on top of light gray granite boulder. 4'x3' and 10" above grass surface. Top of ridge 90 feet east of small flowing creek. Animal undoubtedly basking in exposed position to get benefit of late afternoon hazy sun. Cloacal Temp. 26.5° C. Rock surface 30.8° C. Air 24.2°C. one inch above rock (bulb shaded). Snake active adult - over two feet long.